Phycological Bulletin

No. 6

JUNE 1958

Issued by
The British Phycological Society

Phycological Bulletin

No. 6

JUNE 1958

Issued by
The British Phycological Society

THE BRITISH PHYCOLOGICAL SOCIETY

MEMBERS OF COUNCIL AND SUB-COMMITTEES FOR THE YEAR 1958.

Officers of Council.

President: Dr J.W.G. Lund.

Vice-Presidents: Dr E.M. Burrows, Dr G.E. Fogg.

Hon. Secretary: Mr H.T. Powell, Marine Station, Millport, Isle of Cumbrae, Scotland.

Hon. Treasurer: Dr M.T. Martin, University Hall, Bangor, Caernarvonshire, North Wales.

Ex-Officio Members of Council.

Immediate past-President: Professor L. Newton.

Hon. Editor of Phycological Bulletin: Dr E. Conway, Department of Botany, The University, Glasgow, W.2.

Other Members of Council.

To retire January 1959.	**To retire January 1960.**
Dr H. Blackler,	Dr A.J. Brook,
Mrs Dorothy Hepper,	Dr R.W. Butcher,
Dr F.E. Round.	Dr W.E. Jones.

Hon. Auditors: Dr J.K. Spearing, Professor W.T. Williams.

Committee for Marine Algal Check-list and Flora:

Dr M.W. Parke (Chairman), Dr E.M. Burrows (Secretary),
Dr P.S. Dixon (Assistant Secretary), Dr H. Blackler,
Dr R.W. Butcher, Dr M.R. Droop, Mr N.I. Hendey,
Mrs Dorothy Hepper, Dr M.T. Martin, Dr M. Naylor, Mr H.T. Powell.

Committee for Algal Nomenclature:

Mr R. Ross (Secretary), Miss C.I. Dickinson, Mr. E.A. George,
Dr J.W.G. Lund, Dr M.W. Parke.

Committee for Protection of Collections and Slides of Freshwater Algae:

Dr J.W.G. Lund (Secretary), Mr E.A. George, Mr R. Ross.

BRITISH PHYCOLOGICAL BULLETIN

No. 6 JUNE 1958

Honorary Editor: Elsie Conway,
Department of Botany,
University of Glasgow.

CONTENTS

Page

Council and Sub-Committees of the British Phycological Society, 1958 .... (ii)

Kathleen M. Drew: a tribute .... (iv)

Meetings of the Society:

Summer Meeting at Flatford Mill, September 1957 13

Annual General Meeting, London, January 1958 14

Financial Statement for the year ending November 1st. 1957 20

Abstracts of Papers read at the London Meeting, 1958 21

Chromosome Numbers in the Algae:

I. The Phaeophyta 34

Future Field Meetings of the Society 40

Book Reviews:

Marine Algae of the North-eastern Coast of North America 41

Viznachnik prosnovodnikh bodorostei Ukrains'koi RSR. V 42

Report of the Freshwater Biological Association, 1957 43

News Bulletin of the American Phycological Society, 1957 44

Letters to the Editor:

Marine Algae of the Channel Islands - P.S. Dixon 45

Occurrence of *Gelidium sesquipedale* in Britain - P.S. Dixon 47

Distribution of Balbania - Miss Erica Swale 49

Requests for Research Material 49

Use of Algal Record Cards 50

List of Members (as at 1st. April 1958) 51

KATHLEEN M. DREW D.Sc.

(Mrs. H. Wright Baker)
1901 - 1957

AN APPRECIATION

With the death of Kathleen M. Drew on September 14th. 1957, the British Phycological Society lost a member who was largely instrumental in its foundation, and who, by her work as its first president, can fairly be said to have established the Society.

The Phycological Bulletin was regarded by Dr Drew as one of the major projects of the Society. In compiling this special number, the Council seeks to record their appreciation, not only of her work for the Society but for Phycology in general.

The death of Dr Baker leaves a gap in our Society and British botany which we cannot fill, and many of us have lost an old and dear friend. Yet, if I say little about her, it is because there is no need. In the tributes which follow the value of her work and her personality are clearly depicted. Above all, the esteem and affection in which she was held shine forth again and again.

In these days there are so many biological societies, holding such frequent meetings and covering so wide a field, that the formation of another might well seem to be a precarious undertaking. Dr Baker, as was typical of her, came to no hasty conclusion that a phycological society was needed. No doubt she considered the matter in that clear, straightforward manner so delightfully characteristic of her. Its success and the happy atmosphere in which it always meets justify her clear-sightedness, and all the time and effort she spent on it.

Everything she did was well done. Her papers, particularly those describing original investigations, are models for any student. Her standards were high, yet her lack of pretention and capacity for friendship ensured that the less gifted or experienced of us never felt frustrated. We admired her work, enjoyed discussing it with her and were delighted to have had a part, if only as spectators, in the unravelling of some of the fascinating intricacies of the Rhodophyceae. It was enough for her that we too were interested in the algae. I very much doubt whether she understood the phrase 'to talk down to someone'. She might have said she did, but this attitude was so foreign to her that she would not have known how to set about doing it.

Dr Baker will be sadly missed by friends and phycologists all over the world. Those of us who have been 'seaweeding' with her or have visited her and her family at home, will have their sorrow that she is no longer with us lessened by the happy memories of those times.

J.W.G. Lund
President, British Phycological Society.

Freshwater Biological Station,
Ambleside,
Westmorland.

KATHLEEN M. DREW

(Mrs. H. Wright Baker)

The death of Dr Kathleen M. Baker on September 14, 1957 has left a gap amongst phycologists not easily to be filled. Her work on the Rhodophyta had, of course, been widely known for many years, but it was in the last seven years since the International Botanical Congress in Stockholm in 1950 that she had become more personally known to many Phycologists both in Britain and overseas. Those years saw the formation of the British Phycological Society of which she was the main instigator and the first President, and at whose meetings she became so well known to phycologists of all ages. During this time, too, she travelled abroad quite extensively and visited many workers in her own field, as well as taking an active part in international meetings and enjoying the personal contacts which they afforded.

All who came into contact with Kathleen Baker in her scientific work were impressed with her quiet drive and her capacity for getting things done. This was largely due to a quality of single-mindedness which led her to pursue her main interests and to forgo other activities which would have competed for her time and energy. Combined with this was the superbness of her method and organisation, whether in research, in collecting in the field or indeed in the planning of her whole life. Those who knew her best were continually amazed at her capacity to run her home and care for her family, and to combine this with the claims of her professional work. She was deeply concerned with the upbringing of her children and was always ready to meet their demands on her, as she was indeed to meet any human problem with sane help and advice. But, having dealt with a problem and reached a decision, she could then put it behind her and get on with the work in hand, and in this capacity for concentration lay the secret of her great output of work in recent years, although domestic help had become scarce and the claims of her home more insistent.

Perhaps her most important contribution in recent years lay in the open mind which she brought to bear upon phycological problems and her critical appraisal of what had hitherto been accepted as fact. To work with her was a continual stimulus; she would accept nothing shoddy or incomplete, but her criticism was always encouraging and constructive, and, as many of her research students would testify, she expected the best of them and therefore obtained it.

Kathleen was a member of the Society of Friends and their fellowship meant much to her. Her absolute integrity, her refusal to compromise with fact or truth as she saw them, as well as her personal modesty and high standards all had their basis there. Many of us will feel that we have lost a friend, a colleague and an adviser; with her we were always sure of good companionship, a sharing of interests, and helpful and sound advice. Some of us, however, were privileged to attend the Memorial Service held for her at the Friends' Meeting House in Manchester and remember with appreciation the dominant note of gratitude for her life; we will all feel, too, that with us lies the responsibility for carrying on as far as we can the work and projects which she had so much at heart.

Margaret T. Martin
Hon. Treasurer, British Phycological Society.

University Hall,
Bangor.

In this memorial number of the Phycological Bulletin, I would like to pay special tribute to Dr Kathleen Baker's unique contribution toward founding and sustaining the British Phycological Society. It was her idea to bring together a group of British phycologists for an informal field meeting and discussion of mutual interests and problems, a project in which, from the beginning, she had the support of Dr M.T. Martin. At a stimulating first meeting, held at Bangor in September 1951, several plans were suggested and it was decided to hold further meetings*. A committee was formed, with Dr Baker as chairman, which arranged three further meetings of the group, at the British Museum in January 1952, at Edinburgh in July 1952 and at Queen Mary College, London in January 1953. During this period, an ever-increasing number of phycologists became interested in the activities of the group; and the British Phycological Society was founded at the Edinburgh Meeting in 1952.

The first Council of the Society was elected in January 1953, and Dr Baker was unanimously elected our first President - not only because we wished to acknowledge the leading part she had played in our affairs, but also because we wanted a person with her particular qualities at the helm during the first few formative years of the Society's existence. How characteristic it was of Dr Baker that, having started and worked hard for a movement which resulted in the formation of a useful and active professional society, she was most reluctant to accept the honour of being its first president. She was, however, persuaded; and her guidance of the Society through its first two years culminated in her Presidential Address, *Phycology and the British Phycological Society (Phycological Bulletin,* 3, 1-9.) This address again shows remarkably clearly Dr Baker's critical approach to her own work and her no less critical assessment of the work of others. The address also re-emphasises the principal aims of our Society, and suggests ways in which all members might most usefully participate in its activities and justify its continuance. Dr Baker continued to serve on the Council of the Society, first as past-President and later as a council member, until her death; and so we continued to benefit from her wise counsel.

Dr Baker was also a leading member of the Society's Marine Algal Check-list and Flora Committee; and, together with Dr Martin, she had assumed responsibility for producing the volume on Rhodophyta in the proposed new Flora of British marine algae. Her sudden death, at the height of her ability and as she was arranging to devote time to the preparation of this book, is a tragic loss to phycology. She will be sadly missed by us all, both as friend and colleague.

* These early meetings were reported in *Nature, Lond.,* 168, 639, and in *Phyc. Bull.,* 1, 1.

H. T. Powell
Hon. Secretary, British Phycological Society.

Marine Station,
Isle of Cumbrae.

With the untimely death of Dr Kathleen Baker on September 14th, 1957, we have lost one of our most meticulous investigators of the morphology, cytology and life histories of the red algae. She started this broad field of research during the two years (1925-1927) that she studied in the United States of America, mainly with Setchell and Gardner at the University of California, under a Commonwealth Fellowship. One of the excellent features of these Fellowships is that the Fellows must use the summer holidays for travel. In addition to visiting many parts of California, Dr Baker was thus able to visit Hawaii, Friday Harbour in the State of Washington and Woods Hole in Massachusetts, amongst other places.

Her first major work, which appeared in 1928 in the University of California Publications in Botany, was a taxonomic study of the marine species of the *Acrochaetium-Rhodochorton* complex of the Pacific coast of North America. In this paper she treated of 34 species, 19 of which she described as new and all of which are still accepted. She retained a life-long interest in this group of algae. In 1935 she published, in the Annals of Botany, an important paper in which the first detailed account was given of the structure and reproduction of a fresh-water member of the complex (*Audouinella violacea)* and in 1936 she provided convincing evidence that *Chantransia boweri* is conspecific with *A. violacea.* In recent years she had been gathering material for a monograph of the species related to *Rhodochorton rothii.* I shall always be indebted to *R. rothii* (or whatever its correct name may be) because it was this species that was largely responsible for the first exchange of letters between Dr Baker and myself in 1945. I greatly valued this correspondence which continued until a few weeks before her death and in the course of time covered many questions of mutual interest.

When I discovered in 1945 that the name *Rhodochorton rothii* could not be used for the plant to which this epithet had been applied, it became necessary to find another name for this alga. One of the likely substitute names was *R. purpureum* but there was some doubt about this as nobody had apparently ever examined the type (if such existed) of *Byssus purpurea* Lightfoot (1777), the basionym of *R. purpureum,* or had ever carefully studied material collected at the type locality, which was the Abbot Mackinnon's tomb in the chancel of Iona Cathedral, on the Island of Iona, Scotland. Following some correspondence between us about this, and in her customary way of wanting to get to the bottom of things, Dr Baker convinced her family of the advantages of a vacation trip to the Island of Iona. This they did in the summer of 1948. Although, to quote from her letter of July 7, 1948, "The cathedral is now reroofed and much renovated and the tomb is entirely free from plant growth, a statement which is by no means true for the rest of the interior of the church", she none the less succeeded in finding *B. purpurea* "on the wall of a small passage between the ruined refectory and cloisters." Preliminary examination indicated that *R. purpureum* might not be the same as *R. rothii,* but a detailed study of this plant was contemplated by Dr Baker as part of her projected monograph of *Rhodochorton.*

During the tenure of the Commonwealth Fellowship, Dr Baker also gathered material in California and at Woods Hole (and later in Britain) for cytological and morphological work on *Spermothamnion.* Her Berkeley friends of that period still recall the overnight camping trips to the sea that were made with the purpose of collecting material (probably of *S. snyderae*) and that an alarm clock was one of the essential pieces of equipment taken along, so that she could get up to fix material at two-hour intervals throughout the night.

The main objectives of this work on *Spermothamnion* were to determine the nuclear history of an alga which bears polysporangia instead of tetrasporangia (*S. snyderae*) and of one in which tetrasporangia and sexual organs are commonly formed on the same plant (*S. turneri*). The papers that resulted from this work should be read to be fully appreciated. The polysporangium of *S. snyderae* was shown to be homologous with the tetrasporangium of other red algae, the only difference being that the sporangium primordium contains several diploid nuclei instead of one. In regard to *S. turneri*, it was established that this species is predominately diploid and that in addition to haploid, triploid plants also occur. The triploid plants are sterile but the diploid plants form functional sexual organs as well as tetrasporangia. The absence of tetraploid plants in nature suggests that the tetraploid carpospores may not be viable. In Britain the haploid plants form sporangium primordia but these abort.

The work on *Spermothamnion snyderae* led to an investigation of *Plumaria elegans*, which called for study because it forms parasporangia in addition to tetrasporangia and sexual organs. She made the significant discovery that the plants that bear parasporangia are triploid. No change in chromosome number accompanies paraspore formation and the triploid spores give rise to other triploid plants. These interesting observations on *Spermothamnion* and *Plumaria* thus furnished not only the first proof of the existence of polyploids in the algae but showed that in *P. elegans* we apparently have a plant with two entirely closed and independent cycles--one the sexual cycle, which includes the usual alternation between haploid gametophytic and diploid sporophytic plants and the other asexual by means of triploid spores. The genetic and evolutionary implications of the findings in regard to *S. turneri* and *P. elegans* were considered by Dr Baker in a thought-provoking short paper in Nature in 1948. In this, as indeed in all her writings, she cautioned against the making of hasty conclusions and broad generalizations on the basis of facts learned from only one or a few investigations.

The new knowledge obtained from her own work on the cytology and life histories of various red algae, including her more recent work on *Porphyra*, as well as that of other investigators, had as a natural outgrowth the several critical review papers that she wrote on the life histories of the red and other groups of algae.

Dr Baker's recent spectacular discovery that the filamentous shell-inhabiting alga known as *Conchocelis* is a phase in the life history of the classical and much-studied *Porphyra* immediately attracted world-wide attention. This discovery is not only of considerable botanical interest but has far-reaching practical implications in those countries in which *Porphyra* is extensively cultivated for food. Some of the remaining gaps in our knowledge of the life history of this alga have already been filled by Tseng and Chang in China and it would seem that the controlled production of conchospores (as the spores formed by *Conchocelis* are termed by Tseng and Chang), which serves as "seed" for *Porphyra*, is within sight.

Those who were privileged to know Kathleen Baker well will remember her as a forthright, sincere and kindly person who was devoted to her family, her friends and her science. Her colleagues, students and friends in many parts of the world will miss her presence.

George F. Papenfuss

University of California,
Berkeley,
U.S.A.

La brusque disparition de Dr K.M. Drew le 14 septembre dernier a été une grande perte pour la Science des Algues, vivement ressentie par tous ceux qui l'ont connue et avaient pu apprécier la grande valeur scientifique de ses travaux ainsi que la cordialité de ses relations avec ses collègues de tous les pays.

L'oeuvre de Dr Drew est presque exclusivement consacrée aux Algues Rouges. Après ses études supérieures à l'Université de Manchester, elle obtint une boures de recherches pour les Etats-Unis et séjourna pendant deux ans à l'Université de Californie à Berkeley, au Laboratoire du Prof. W.A. Setchell. Le résultat de ses recherches fut une remarquable monographie des Acrochaetiacées des côtes pacifiques de l'Amérique du Nord.

De retour à Manchester, ses travaux sur la cytologie des *Spermothamnion* et du *Plumaria elegans* en particular ont eu un grand retentissement. Plus récemment, ses recherches sur la reproduction des Bangioideae et sa découverte de la nature du *Conchocoelis rosea,* jusqu'alors considéré comme une espèce autonome alors qu'il ne représente qu'une phase du cycle des *Porphyra* et des *Bangia,* ont complètement bouleversé nos conceptions classiques sur le cycle vital de ces algues.

Par la précision de ses techniques, comme par la rigueur de ses conclusions, les recherches de Dr Drew ont apporté une contribution des plus importantes et des plus originales à la connaissance des Algues Rouges.

Ses travaux l'ont conduite en outre à réexaminer les problèmes classiques de l'alternance de générations chez les Algues et les conceptions personnelles qu'elle a exposées, dans d'excellentes mises au point de ces problèmes, ont largement contribué au développement des idées modernes à ce sujet.

Dr Drew avait su attirer autour d'elle de nombreux élèves, tant britanniques qu'étrangers, dont elle dirigeait les travaux avec sollicitude.

Elle avait pris une part prépondérante à la création en 1952 de la Société phycologique britannique dont elle fut la première présidente.

Lors du Congrès international de Botanique à Paris, où elle était vice-présidente de la Section de Phycologie, elle avait pu prendre contact et nouer des liens d'amitié avec de nombreux phycologues francais.

L'an dernier, elle avait donné son adhésion à la Société Phycologique de France et souhaitait une étroite collaboration entre notre société et la société britannique.

Les Phycologues francais et la Société Phycologique de France s'associent avec émotion au deuil de leurs confrères brittaniques et partagent leurs regrets.

J. Feldmann

Institute Océanographique.
Paris.

(Notice nécrologique presentée a le Société Phycologique de France (Séance du 7 er mars 1958).)

The following appreciations are reprinted by courtesey of the editors of the journals concerned:

Reprinted from *Nature, London,* 180, 889-890.

The death of Dr Kathleen M. Drew (Mrs. Wright Baker) on September 14 has brought to a tragically early close a career of distinguished and devoted work in phycology in the very difficult field of the red algae. Most of this work was associated with the Department of Cryptogamic Botany in the University of Manchester, where she graduated in 1922, and later worked as a member of staff and as research fellow, first with Prof. W.H. Lang and later with Prof. C.W. Wardlaw; she received the degree of D.Sc. of the University of Manchester in 1939. Dr Drew was one of the earliest of the Commonwealth Research Fellows and spent two years in the United States, chiefly at the University of California, where some of her early systematic studies on the red algae culminated in the publication of her monograph, "A Revision of the Genera *Chantransia, Rhodochorton,* and *Acrochaetium*"; in later studies of this period of her work, for example, on *Spermothamnion* and *Plumaria,* she developed the cytological techniques which formed a basic part of her later work.

After her marriage with Prof. H. Wright Baker, she maintained and developed her interests in the red algae with singular success alongside those of her very happy family life. With the publication in 1944 in *Biological Reviews* of her review on the nuclear and somatic phases in the Florideae, she set the stage for the later developments in her work, where she made notable advances in linking morphological and cytological observations with cultural and physiological investigations into the life-histories and inter-relationships in the Rhodophyceae, that most varied and interesting group of algae. Perhaps one of the most striking results of this experimental attack was the identification of *Conchocelis rosea* as a deep-water, shell-inhabiting phase in the life-history of *Porphyra umbilicalis,* on which she was preparing a further series of investigations.

Dr Drew's numerous publications have appeared in many scientific journals. She was planning to start work on a book; and though we shall not now have this wider expression of her views, it is indeed fortunate that from time to time she had written articles such as those which have appeared in the *Botanical Review, Biological Reviews, Phytomorphology,* and in the chapter which she contributed to the "Manual of Phycology", which have reviewed the contemporary position as she interpreted it for the field which she had made so notably her own. She was a familiar figure at international congresses and meetings, which she often attended as an invited speaker.

Dr Drew was much concerned with the future of phycology in Britain, and felt strongly the need to train younger workers in this field. With this aim in mind, she was one of the prime movers in the formation in 1952 of the British Phycological Society and was its first president. The Society owes much to her enthusiasm and wise guidance during its early years; she was regular in her attendance at its field meetings, and there are many younger botanists who will miss her critical and kindly help on these occasions. For colleagues and research students alike, her place can never be filled. Her work was characterized by outstanding integrity of mind and purpose, and unsparing devotion to the exacting demands of difficult techniques; and these same qualities gave a special value to her advice or help in a variety of fields. To her research students, who came from many parts of the world, Dr Drew was a stimulating and readily assessible supervisor, as keenly critical of their work as she was of her own; and all of them will have grateful memories of her kindly hospitality and sympathetic friendship.

Department of Botany,
University of Manchester.

Mary Calder

Reprinted from *Revue Algologique*, 1958.

It was with the greatest regret that the many friends of Dr Kathleen Drew Baker received the news of her death after only a short illness. Her accurate, alert mind was in its full vigour and few people had any awareness that her health was impaired. She had lived a full life with many interests, and she will be greatly missed in all the spheres of her activity.

Kathleen Baker was born in 1901 in Leigh (Lancashire) but her parents moved to Salisbury when she was young and she was educated at Bishop Wordsworth's co-educational school in that town. The academic standard of the school was high and the teaching of Botany was taken seriously. Kathleen left it having been awarded a County Major Scholarship which was a much prized award in those days. She took up her studies at the University of Manchester where she worked under Professor Weiss and after graduation in 1922, was helped by Professor Adamson to complete an M.Sc. She then became an Assistant Lecturer in the Botany Department at Manchester and served for two years under one of the most distinguished botanists of the century, Professor Lang. Subsequently the award of a Commonwealth Fellowship took her to the United States where she worked in California under the famous combination of American phycologists, W.A. Setchell and N.L. Gardner. After travelling to Hawaii and elsewhere in search of material she returned to the staff of Manchester and married Professor H. Wright Baker of the Manchester College of Science and Technology.

After her marriage, though she had the care of the home and of her husband and two children, Kathleen Drew Baker, as she then became, continued her scientific work and found time, too, for other interests, particularly that of Ashburne Hall of Residence in Manchester. She was awarded the D.Sc. of the University of Manchester in 1939 and the quality of her investigations received further recognition when she was made a Research Fellow in the Laboratory of Cryptogamic Botany.

The research field of British Algology has been greatly enriched by the work of Kathleen Drew Baker. Her clear and acute mind, her skill in techniques and her unfailing enthusiasm have combined to make outstanding contributions to science. The accompanying list of publications shows the breadth of her interests and shows, also, that she was recognised internationally as an authority on the Rhodophyceae. For many years she had been a stimulating director of research students and her vision saw the need to establish a British Phycological Society, of which she was the first President. It is difficult to imagine the Society or the meetings of its Council without her wisdom and judgment and her exact memory; she accomplished so much in so many ways that her loss is very serious. In addition moreover, her many friends have lost a wise counsellor and a colleague of great integrity. We sympathise deeply with her husband and two children, knowing that they, like us, will feel that she leaves not only a responsibility but also a challenge.

Lily Newton

University College of Wales
Aberystwyth.

Reprinted from the *Manchester Guardian*, 21st Sept. 1957.

With the death of Dr Kathleen Drew Baker, the University of Manchester has lost a distinguished scholar, and botanical science a leading exponent of the cytology and life history of the Red Seaweeds. On graduating from Manchester in 1922, with first-class honours in botany, she became profoundly interested in the investigation of this rich and varied group, and with the passage of time made many novel and penetrating observations. Her work, undertaken during the tenure of various fellowships, involved wide travel and contact with other workers in this field. For her published research she was awarded the degree of Doctor of Science of Manchester University in 1939.

Since the end of the war, although Dr Baker (who was the wife of Professor Wright Baker, of the Manchester College of Science and Technology) had the care and management of her home and family, as well as other interests (e. g. Ashburne Hall), she nevertheless found time to continue her scientific studies with a zeal and energy that delighted and sometimes astonished even those who knew her best. The value of her contributions to botany was recognised by her being attached to the university as a part-time Research Fellow in the Laboratory of Cryptogamic Botany and by her teaching in the honours school.

During this phase, Dr Drew Baker continued to make important discoveries, often of a quite unexpected kind, regarding the life relationships of certain marine algae, and to discuss the findings of a life-time of experience in their more general and philosophic aspects. The collective effect of her work has been to widen our whole conception of the life cycles of the Red Algae. It has brought her international reputation and research students from many parts of the world. She took a leading part in the formation of the British Phycological Society and served as its president, and she was an invited speaker at several international symposia.

Kathleen Drew Baker's investigations, which lay in a field of considerable technical difficulty, were characterised by an open and imaginative outlook, qualified by great patience, caution and a rigorously imposed self-criticism. She will be remembered by her fellow botanists and friends for her modesty and for the integrity and exactitude which characterised all her work.

C. W. Wardlaw

Department of Botany,
University of Manchester.

Reprinted from the Magazine of the *Ashburne Hall Association*, 49, Dec. 1957.

By the death of Kathleen Baker, on September 14th, after a short illness, Ashburne Hall has lost a devoted friend and one of her most distinguished students. After the first world war, Ashburne was not large enough for all the women students who wanted to come into residence and Lees Hall was started in Fallowfield to house them. Kathleen was one of its first students and always spoke of it with great affection. On taking her degree in 1922 she transferred to Ashburne where she had been awarded the Research Scholarship in Botany, and she maintained her love for the Hall throughout her life.

Following a distinguished record in the University she was awarded one of the first Commonwealth Research Fellowships to study in the United States where she made many friends. She joined the staff of the Manchester Botany department; but after her marriage and with the increasing claims of home and family she was only able to give part time to her scientific work and became a University Research Fellow. Such was the quality of her work, however, that it gained her international recognition and attracted students from many countries to work on the Algae under her direction. In 1939 she was awarded the D.Sc. of Manchester University. Several pieces of outstanding research on the Red Algae were nearing completion at the time of her death and she was looking forward to having more time for her botanical work as her family grew up. She was one of the founders of the British Phycological Society and served as its president. Kathleen was characteristically modest about her scientific attainments and it is doubtful if her Ashburne friends recognised what a distinguished scientist they had among them.

To many, the care of home and family and the pursuit and direction of research would have provided a full time occupation, but not to Kathleen. Her hospitable home was always open to her own and her husband's students and to their friends and colleagues on the staff. Her love of Ashburne was shown in the thought she devoted to her work as representative of the Ashburne Association on the Ashburne Hall Committee, and in her presidency for several years of the Association. Whether it was in running her home, in her scientific work or on committee the same thoughtful care, selfless service and high standards were always to be seen.

Kathleen Baker will be sorely missed, not only by her loved ones at home and by Ashburne Hall and the University, but by a wide circle in many countries of those who admired her as a scientist and valued her as a friend.

E.M. Lind

"Drew", as she was known when she came up to College in 1919, and as she remained to her contemporaries for the rest of her far too short life, was one of a particularly good group of Freshers chosen by Mrs. Hogg to be the pioneers of Lees Hall. First impressions were of a serious-minded, rather shyly charming student, with a good measure of natural courtesy and plenty of good humour with which to cope with the difficulties of living in a house only three-quarters ready when the session began. One didn't have to know "Drew" very long, however, before realising what a first-rate mind she had, well-ordered, clear-cut, enquiring and critical. Though she never rose to heights of leadership socially as an undergraduate, she could always be relied upon to play her part in whatever was afoot, and to give a sound opinion in any discussion. She was a person of competence and integrity and lovable withal.

In her first two terms she did so well in examinations that in the summer, while the rest of us were preparing for "Inter," she was allowed to embrak on independent study of *Chara*, a green relation of the red algae with which her name was to become associated. It was a large Botany Honours School that year, for those days, thirteen strong, and as was expected she and William Leach (who was to become Professor of Botany at Winnipeg) gained firsts. And now with the award of the Ashburne Hall Research Scholarship, her long connection with Ashburne proper began.

As an undergraduate she had entered whole-heartedly into Professor Adamson's Saturday botanical expeditions for the study of ecology, and each summer vacation, during his extented excursions to the Lake District, she was an acknowledged student leader in this field. I remember her also in 1923 at a summer school run by Professor Chodat, of

Geneva, at Bouvy St. Pierre, following with ease lectures given in French, eagerly bottling "red snow" discovered on the Great St. Bernard Pass in a thermos flask, and rejoicing over a lovely red pool that we found in a side valley, rich in unicellular red algae.

The years that followed brought new honours, new commitments and a widening circle of friends in England and abroad, but old friends were never forgotten. Many an American who entertained her during the period of her Commonwealth Fellowship (and of these few have been held by women) has in turn been entertained in the home for which her husband-to-be was busy making lovely furniture while she was away. Yet fellow students of her Lees days visited her there, too; and during her last illness it was Miss Ada Conway of Lees and Ashburne Hall, who in devoted friendship took up the domestic responsibilities which she could no longer carry.

Dorothy Brittain
Editha Jackson

....

LIST OF THE PRINTED WORKS OF KATHLEEN M. DREW

1924. An abnormal pro-embryonic branch of *Chara vulgaris* L. *Ann. Bot. Lond.*, **38**, 207-209.

1925. Sur des chatons anormaux d'une espece de *Salix Linnaea.* (1924-1925), 64-68.

1926. The "leaf" of *Nitella opaca* Ag. and adventitious branch development from it. *Ann. Bot. Lond.*, **40**, 321-348.

1928(a) Notes from Wood's Hole Laboratory: *Seirospora* (Griff.) Harv. *Trailliella* (Intric.) Batters. *Rhodora*, **30**, 195-197.

(b) Revision of the genera *Chantransia, Rhodochorton* and *Acrochaetium*. *Univ. Calif. Pub. Bot.*, **14**, 139-224.

1930. The occurrence of heterocysts and spores at both ends of the filament in the genus *Cylindrospermum* Kütz. *Rev. algol.*, **5**, 143-145.

1934. Contributions to the cytology of *Spermothamnion turneri* (Mert.) Aresch. I. The diploid generation. *Ann. Bot. Lond.*, **48**, 549-573.

1935. Life History of *Rhodochorton violaceum* (Kütz) comb. nov. (*Chantransia violacea* Kütz.). *Ann. Bot. Lond.*, **49**, 439-450.

1936. *Rhodochorton* (Kütz.) Drew and *Chantransia boweri* Murray and Barton. *Ann. Bot. Lond.*, **50**, 419-421.

1937. *Spermothamnion snyderae* Farlow, a Floridean alga bearing polysporangia. *Ann. Bot. Lond.*, N.S. **1**, 463-476.

1939. An investigation of *Plumaria elegans* (Bonnem.) Schmitz with special reference to triploid plants. *Ann. Bot. Lond.*, N.S. **3**, 347-368.

1943. Contributions to the cytology of *Spermothamnion turneri* (Mert.) Aresch. II. The haploid and triploid generations. *Ann. Bot. Lond.*, N.S. **7**, 23-30.

1944. Nuclear and Somatic Phases in the Florideae. *Biol. Rev.*, **19**, 105-120.

1945(a) A hitherto undescribed from of adult axis in the genus *Batrachospermum*. *Nature. Lond.*, **155**, 608.

(b) Use of hydrochloric acid for softening algal tissues for microtome sections. *Nature. Lond.*, **156**, 479.

1946(a) Life histories in the Nemalionales. *Nature. Lond.*, **157**, 274-275.

(b) Anatomical observations on a new species of *Batrachospermum*. *Ann. Bot. Lond.*, N.S. **10**, 339-352.

1948. Genetics and Algal Life Histories. *Nature. Lond.*, **161**, 223-225. (also in *Australian J. Sci.*)

1949(a) *In situ* development of carpospores of *Bonnemaisonia asparagoides*. *Nature. Lond.*, **163**, 253-254.

(b) Occurrence of *Falkenbergia* on the English coast (with C.C. Harvey). *Nature Lond.*, **164**, 542-543.

(c) *Conchocelis*-phase in the life history of *Porphyra umbilicalis* (L.) Kützt. *Nature. Lond.*, **164**, 748-749.

(d) A study of certain British seaweeds and their utilisation in the preparation of agar (with Marshall, Newton and Orr et. al.) H.M. Stationery Office Monogr. No. 11.145.

1950(a) Aspects of the life history of *Porphyra umbilicalis* (L.) Kütz. *Proc. VII Bot. Congr.* TCR 834-835.

(b) Occurence of *Asparagopsis armata* Harv. on the coast of Cornwall. *Nature. Lond.*, **166**, 873-874.

1951. *Rhodophyta.* Manual of Phycology (*Chronica Botanica*) U.S.A.

1952. Studies of the Bangioideae. I. Observations on *Bangia fuscopurpurea* (Dillw.) Lyngb. in culture. *Phytomorphology.* **2**, 38-51.

1953. Studies of the Bangioideae. II. The *Conchocelis*-phase of *Porphyra* species in *Pollicipes cornucopia* Leach at Roscoff (with K.S. Richards). *J. Linn. Soc. (Bot.)*, **55**, 84-87.

1954(a) Organisation and inter-relationships of the carpospores of living *Florideae*. *Phytomorphology*, **4**, 55-69.

(b) Studies of the Bangioideae. III. Life history of *Porphyra umbilicalis* (L.) Kütz. var. *laciniata* (Lightf.) J. Ag. A. The *Conchocelis*-phase in culture. *Ann. Bot. Lond.*, N.S. **18**, 183-211.

(c) Life history of *Porphyra*. *Nature. Lond.*, **173**, 1243.

(d) Professor F.E. Fritsch: a tribute. *Brit. Phycol. Soc. Bull.*, **2**, 1.

(e) Preparation of *Rhodophyta* for cytological observations. *Brit. Phycol. Soc. Bull.*, **2**, 2-3.

(f) Culturing the Bangiales. *Brit. Phycol. Soc. Bull.*, **2**, 6-7.

(g) Life histories in the Algae. *Proc. VIII Bot. Congr.*: Sec. **17**, 50-57.

1955(a) Sequence of sexual and asexual phases in *Antithamnion spirographides* Schiffner. *Nature, Lond.*, **175**, 813.

(b) Life histories of the algae with special reference to the *Chlorophyta, Phaeophyta* and *Rhodophyta*. *Biol. Rev.*, **30**, 343-390.

(c) Phycology and the British Phycological Society. *Brit. Phycol. Soc. Bull.*, **3**, 1-10.

(d) The Institute of Seaweed Research. *Nature, Lond.*, **176**, 155-156.

1956 (a) Phytoplankton of Lake Tanganyika. *Nature, Lond.*, **177**, 520-521.

(b) *Conferva ceramicola* Lyngbye. *Bot. Tidsskr.*, **53**, 67-74.

(c) List of Rhodophyta from St. Bees Head, Cumberland. *Brit. Phycol. Soc. Bull.*, **4**, 21-23.

(d) Reproduction in the Bangiophycideae. *Bot. Rev.*, **22**, 553-611.

(e) The Myxophyceae and Chlorophyceae of New Zealand. *Nature, Lond.*, **178**, 1102-1103.

1957 (a) List of Rhodophyceae from Dale Fort, Pembrokeshire. *Brit. Phycol. Soc. Bull.*, **5**, 26-29.

(b) *Polyides* and *Polyides rotundus*. *Brit. Phycol. Soc. Bull.*, **5**, 33-34.

(c) Review: Die Gattungen der Rhodophyceen by H. Kylin. *Brit. Phycol. Soc. Bull.*, **5**, 37.

(d) The Red Algae (1906-1956 and after). *Nature, Lond.*, **180**, 112-115.

(e) Occurence of motile gametes in *Prasiola stipitata* Surh. (with I. Friedmann). *Nature, Lond.*, **180**, 557-558.

1958 (a) The typification of *Polyides* and *Furcellaria*. *J. Linn. Soc. (Bot.)*, **55**, 744.

(b) Studies in the Bangioideae. IV. The *Conchocelis*-phase of *Bangia fuscopurpurea* (Dillw.) Lyngb. in culture. *Pubbl. Staz. zool. Napoli.* (in the press).

Bound copies of reprints of these papers have been lodged at the British Museum and in the library of the University of Manchester. Dr Drew's algal library will be housed as a special unit in the library of the Cryptogamic Laboratory of the Department of Botany in the University of Manchester, and her herbarium will be available for reference in the Cryptogamic Department of the British Museum at South Kensington, London.

(The photograph of Dr Drew which accompanies this tribute has been prepared for the Bulletin by the kindness of Professor H. Wright Baker: it is reproduced from a portrait, painted from a photograph, by his sister, Miss M. Baker.)

SUMMER MEETING AT FLATFORD MILL FIELD CENTRE, SUFFOLK. SEPTEMBER 11th-18th 1957.

By kind permission of the Field Studies Council a summer meeting was held at Flatford Mill Field Centre situated at the head of the estuary of the River Stour which forms the boundary between Essex and Suffolk. Ten members attended the meeting which was organised by Mr F.J. Bingley (The Warden), Dr R.W. Butcher, (Burnham-on-Crouch) and Mr E.A. George (Cambridge).

After supper on **Wednesday, 11th September** we were warmly welcomed by the warden, Mr. F.J. Bingley who had just returned an hour earlier from the British Association meeting in Dublin. Mr Bingley gave a most interesting and comprehensive account of the mill and the surrounding country. Starting from the Domesday Book he traced the records up to the advent of the Field Centre, the first of the five centres which are now run by the Field Studies Council. Particularly interesting were his accounts of the history of navigation on the Stour and the associations with John Constable, the painter. These topics and the natural history of the district were illustrated by an excellent series of colour lantern slides.

Thursday, September 12th. After briefly outlining the algal possibilities of the district, Mr George led the party to two nearby ponds where *Botrydium* and abundant Euglenineae were noticed. Then we walked to Dedham along the willow-lined banks of the Stour whose unusually high level was quickly lowered at a word from the Warden. Fertile *Vaucheria* was plentiful on the shaded banks just above water level and at Dedham itself our finds included *Hydrodictyon*, large colonies of *Aphanothece* and more *Botrydium*.

Friday, September 13th was spent visiting the Fisheries Laboratory at Burnham-on-Crouch where we were welcomed by the Director, Dr H.A. Cole. The various members of the staff demonstrated aspects of their work concerning chiefly oysters, their growth, feeding and parasites. In the afternoon we were taken in two launches up the Crouch estuary where we dredged for oysters and seaweed. In the evening Mr Bingley gave us an introduction to Shingle Street, illustrated like his previous talk with excellent colour slides.

Saturday, September 14th. Members made an all day excursion to Shingle Street on the coast due east of Ipswich. The coast here consists of a vast system of apposition shingle banks cast up by storms and partly eroded in the intervals between the storms. A series of seven lagoons, the most recent still open to the sea, provided some fascinating collecting in waters of different salinities. Further inland we investigated a system of brackish drainage ditches and a salt marsh. Despite, or perhaps partly because of, a complete lack of seaweed on the mobile pebbles of the beach Shingle Street is not without interest to those more used to the rocky shores of the North and West.

In the evening Dr Butcher gave a most interesting talk on algal populations of running waters to about 25 members and guests. He based his talk chiefly on his now classical researches on the colonisation of slides in the Trent and other rivers.

Sunday, September 15th was spent visiting Cambridge where Mr George showed members over the Culture Collection of Algae and Protozoa in the Botany School. The collection which consists of nearly a thousand different strains mostly in pure culture sends out about two thousand cultures each year for research or teaching purposes in universities, schools and commercial firms all over the world. After lunch we "did" the colleges in best tourist fashion and returned to Flatford by way of Lavenham with its magnificent church and wealth of fine timbered buildings, and Kersey with its church on the hill and ford in the village street. Collecting was not neglected and the village pond at Newton yielded a wealth of algae including *Nostoc pruniforme*, *Pandorina*, *Eudorina* and *Volvox* while *Botrydium* was noticed by a pond in Cavendish.

Monday, September 16th. Members visited Dovercourt where hard rock outcrops, to give, together with the breakwater, one of the only considerable substrates for seaweeds in many miles. The dominant littoral zones there are *Fucus vesiculosus*, *Ascophyllum* (without *Polysiphonia*) and *F. serratus*. *Pelvetia* is absent, being partly replaced by a dwarf turf of *Enteromorpha*. A short visit was paid to the saltings, mudflats and *Zostera* beds at Wrabness between Manningtree and Harwich.

Tuesday, September 17th. Visiting the Essex side of the valley opposite Flatford we collected *Hydrodictyon* from the pond at Shirbourn Mill and investigated the small streams feeding the mill pond. Watercress beds were an interesting feature of the main stream, but their cleanliness was not appreciated by those looking for algae.

A number of members having had to leave before the last day, the final leave-taking was personnal rather than formal. We had all appreciated the unfailing help so freely given by the warden and his scientific staff and the unobtrusive efficiency of the domestic side.

E.A. GEORGE.

SIXTH ANNUAL GENERAL MEETING: LONDON, 2nd-3rd JANUARY 1958.

By kind permission of Professor F.M. Haines, a meeting of the Phycological Society was held in the Department of Botany, Queen Mary College (University of London), Mile End Road, London E.1., on Thursday 2nd January and the morning of Friday 3rd January 1958. Dr M.B.E. Godward kindly made the arrangements at Queen Mary College, and about 50 people attended the meeting. 16 members were accommodated in the College Rooms of the Institute of Education (University of London), at 36 Bedford Way, London W.C.1.

The meeting consisted of a **Symposium on Algal Cytology and Taxonomy** which was held in two sessions on Thursday January 2nd and a morning session on January 3rd, and the **Sixth Annual General Meeting** which was held at 4.15 p.m. on January 2nd.

1. SYMPOSIUM ON ALGAL CYTOLOGY AND TAXONOMY

Before opening the Symposium, the President (Dr J.W.G. Lund) remarked that this was the first general meeting of the Society since the sad death of our first President, Dr Kathleen M. Drew Baker, on September 14th 1957. Dr Lund paid tribute to Dr Baker, whom he had known for 25 years, mentioning that it was through her initiative that the group of phycologists, who later formed our Society, were first brought together. As our first President, Dr Baker had worked hard to establish the Society. She was renowned among phycologists everywhere for the excellence of her work, and was always ready to help others. She had died with tragic suddenness, at the height of her powers, and would be greatly missed by us all. Council had that morning passed a resolution recording our appreciation of the great contributions made by Dr Baker to the study of algae and to our Society; the resolution also recorded our sympathy with Professor H. Wright Baker and his son and daughter in the great personal loss they have sustained.

The company then stood in silence, in memory of Dr Baker.

Dr Lund expressed the thanks of the Society to Professor Haines for permission to meet at Queen Mary College, and to Dr Maud Godward for her work in preparation for the meeting.

The following papers were read (see authors' abstracts at end of this report):

1. Dr M.B.E. Godward (Q.M.C.). Meiosis in *Spirogyra crassa.*
2. Mr Y.S.R.K. Sarma (Q.M.C.). Chromosome numbers in Ulotrichales and allied groups.
3. Mr J.P. Sinha (Q.M.C.). Chromosome numbers and life-cycles in members of Cladophorales.
4. Mr B.N. Prasad (Q.M.C.). Cytology and conjugation in *Zygnema* and *Mougeotia.*
5. Dr G.F. Leedale (Q.M.C. and University of Durham). Nuclear division in the Euglenineae: a new form of mitosis.

Dr Lund, Dr Parke, Mr Powell, Mr Ross, Dr Spearing and the authors of the papers contributed to discussions which followed each paper, and Dr Lund thanked the speakers for their papers.

In the afternoon, with the President again in the chair, the following paper was read:

6. Dr A.J. Brook (Freshwater Fisheries Lab., Pitlochry). Two desmid rubbish dumps, *Staurastrum paradoxum* and *S. gracile.*

Dr Lund, Dr Brook, Dr Butcher, Dr Godward, Dr Leedale, Mr Powell, Mr Prasad and Mr Ross took part in a discussion of this paper, and Dr Lund thanked the speaker.

The remaining part of this session was occupied by demonstrations set out in the Botanical Laboratories of Queen Mary College. As well as exhibits relevant to papers being presented in the Symposium, demonstrations were given of electron micrographs of flagellates (Dr R.W. Butcher); colour photography of Fucales (Dr Betty Moss); *Stictyosiphon tortilis* (Dr Margaret Naylor); and *Balbiania investiens* Sirodot, a red algal epiphyte of *Batrachospermum* (Miss Erica Swale).

The third session of the Symposium was held at 10.00 a.m. on Friday January 3rd, with Dr E.M. Burrows (Vice-President) in the chair. The following papers were read:

7. Dr Margaret Naylor (University of Hull). Nuclear structure and classification in the Fucales.
8. Dr Betty Moss (King's College, Newcastle). Observations on the cytology and development of *Himanthalia elongata.*
9. Dr P.S. Dixon (University of Liverpool). The morphology, ecology and taxonomy of certain Florideae.

The papers were followed by discussions in which the Chairman, the speakers, and Dr Blackler, Dr Conway, Dr Godward, Dr Leedale, Dr Martin, Mr Powell, Mr Prasad, Dr Round and Mr Sarma participated. The Chairman thanked the speakers for their papers. Dr Betty Moss projected a series of coloured slides of Fucaceae which was much appreciated, and members spent the remainder of the morning looking further at the demonstrations set out to illustrate the papers.

2. MINUTES OF THE SIXTH ANNUAL GENERAL MEETING.

The Sixth Annual General Meeting was held at 4.15 p.m. on Thursday January 2nd. The President (Dr J.W.G. Lund) was in the chair, and there were 40 members present.

1. **Letters from Members.** The Secretary reported that apologies for absence had been received from Dr M.R. Droop, Mr E.A. George, Miss Hilda Parkes, Dr M. de Valéra, and Dr M.A. Wilson.
2. **The Minutes of the Fifth Annual General Meeting,** held at Birkbeck College, London, on 3rd January 1957, had been circulated to all members in **Phycological Bulletin No. 5.** The Minutes were approved and the Chairman signed the official copy.
3. **Report from Council:**

   (i) **Report of Hon. Secretary.** Mr H.T. Powell summarized the meetings and other activities of the Society during the year 1957 as follows:

   (a) **Meetings:** during the year two general meetings of the Society were held - the one-day meeting at Birkbeck College, London (the Fifth A.G.M.) on 3rd January (see full report in Bulletin No. 5), and the 7-day Field Meeting at Flatford Mill Field Centre, Essex, September 11th - 18th 1957. The number of members attending the Field Meeting was disappointingly small (fewer than a dozen present on any one day), but those who were there spent a very enjoyable week. The excursions were led by Mr Eric George, Mr F.J. Bingley (Warden) and Dr R.W. Butcher, and included visits to the Fisheries Laboratory at Burnham-on-Crouch (by kind permission of the Director, Dr H.A. Cole), and to Cambridge to visit the Botany School. A report of the meeting will be given in Bulletin No. 6.

   (b) **The 1957 Council** met on **two** occassions: on 3rd January 1957 at Birkbeck College, and on 2nd January 1958 at Queen Mary College.

   (c) **Subcommittees.** (i) **The Subcommittee for Marine Algal Check-list and Flora:** Dr Burrows reports that this subcommittee has met twice during the year. The loss of Dr K.M. Drew Baker has been particularly grievous for this committee, and has necessitated some change in the delegation of responsibility for algal groups for the new Floras. It has been agreed that Dr P.S. Dixon, whose special interest is in red algae, shall leave Chlorophyta to help Dr Martin with responsibility for the Rhodophyta.

   The small committee of referees for descriptions sent in for the Flora and Biological Flora of British Marine Algae now consists of Dr M.W. Parke, Dr M.T. Martin and Dr E.M. Burrows. Mr R. Ross has agreed to serve on this committee in an advisory capacity for any nomenclatural problems that may arise.

Two sample descriptions for the Flora of British Marine Algae were published in **Phycological Bulletin** No. 5 (1957) in order to give members of the Society, and others willing to help, an idea of what is needed. During the year two species descriptions have been received for publication as parts of the Biological Flora. Careful analysis of these manuscripts has shown that there is no general agreement yet as to the exact form in which these publications should be produced and a revision of the schedules on which the descriptions are based will be carried out in the very near future.

Some progress has been made in the compilation of a glossary of terms to be used in descriptions of the larger algae. Two lists of agreed terms have been circulated for general use.

The problems facing different members of the subcommittee concerned with different groups of algae are very varied and the members are widely spaced geographically, so that it is difficult to convene frequent meetings of the full committee. When problems arise concerning particular classes of algae, the Chairman and Secretary have been given authority to call an extraordinary meeting of the appropriate members. This procedure will simplify and speed up work on particular groups.

Algal record cards are still not much used by members of the Society and information on the present distribution of British algae is difficult to obtain. The subcommittee has asked Council to consider trying to arrange Field Meetings at parts of the coast for which few recent algal records exist. As examples of such areas, south Cornwall, Northumberland, the Shetland Isles and the Scilly Isles have been suggested.

(ii) **The Subcommittee for Algal Nomenclature:** Mr Ross has reported that it has not been necessary for this committee to meet during the year.

(d) **Phycological Bulletin.** Dr E. Conway continues to serve as Editor of the Bulletin. Bulletin No. 5 was circulated in June 1957 to all members and to 28 subscribing libraries.

(e) **The total membership of the Society** continues to increase and there are now 106 members, compared with 102 a year ago. (79 of our members live in Britain or Ireland; 27 are overseas). During the year 9 new members have joined the Society; they are: in Britain - Mr A.D. Boney (Plymouth), Dr A.J. Brook (Pitlochry), Dr I. Friedmann (at Manchester), Dr R.F. Jones (Seascale, Cumberland), Mr B.N. Prasad (at Queen Mary College); and overseas - Mr Tyge Christensen (Copenhagen), Mr C. van den Hoek (Leiden), Mr Michael Neushul (Scripps Institute, California), and Mr R.S. Simons (Cape town).

The Secretary's report was adopted.

(ii) **Report of Hon Treasurer.** Dr M.T. Martin presented the Income & Expenditure Account and the Balance Sheet for the year ended 1st November 1957 (see copy at end of this report). This could be regarded as a normal year from the point of view of expenditure, with just one Bulletin produced. The surplus for the year was about £16. At Nov. 1st, 9 subscriptions were outstanding; these were now reduced to 4. The balance at the bank was £178.9.10d., most of which had accumulated in previous years. Dr Martin thanked the auditors (Professor W.T. Williams and Dr G.C. Ainsworth) for their help in preparing the financial statement.

The Treasurer's report was adopted.

The Chairman then moved votes of thanks to the Treasurer and the Secretary for their work on behalf of the Society during the year.

4. **Phycological Bulletin.** The Editor (Dr E. Conway) commented upon two new features in Bulletin No. 5. (i) the reproduction of the cartoon (of Professor Fritsch) was technically quite straightforward, so we could now consider including Indian-ink line drawings and diagrams to illustrate articles in future numbers of the Bulletin. Reproduction of photographs is still too expensive, but we may be able to overcome this difficulty before long. (ii) 'Letters to the Editor' were a very welcome feature and Dr Conway hoped that all members would make an effort to contribute letters or articles - of general or special interest, and however short - to Bulletin No. 6. Bulletin No. 6 would contain an up-to-date list of members of the Society, so members should notify the Secretary soon of any recent change of address, etc.

   The Chairman thanked Dr Conway for her work as Editor, and Dr Moss for helping to produce Bulletin No. 5. The Bulletin is very useful and successful, and Dr Lund hoped that members would show their appreciation of it by contributing letters and articles.

5. **Field Meeting** to be held at Galway, Ireland, in full association **with the Third International Seaweed Symposium, August 13th - 19th 1958.** The Secretary ascertained that all members present had received a copy of Circular No. 2 relating to the combined Seaweed Symposium/Field Meeting (sent out to all our members by the Secretariat of the Symposium, University College of Galway), and then outlined further details of the programme given in a letter recently received from Dr M. de Valéra. These additional details, mostly relating to the excursions programme and the accommodation available, would soon be posted to members in Circular No. 3. The Chairman remarked that we were very grateful to Dr de Valéra for sending us latest details of the programme.

6. **Election of Hon. Auditors for 1958.** Dr Martin proposed that Professor W.T. Williams be asked to continue serving as Hon. Auditor to the Society; Dr G.C. Ainsworth now wished to resign from this position and Dr Martin proposed that Dr J.K. Spearing be invited to serve as second auditor. Dr Spearing signified that he would be willing to serve as an auditor, and the two proposals were unanimously approved. The Chairman thanked the auditors for their services to the Society.

7. **Election of Officers and Members of Council for 1958.** The following Officers were unanimously re-elected to the 1958 Council: **President:** Dr J.W.G. Lund; **Vice-Presidents:** Dr Elsie M. Burrows, Dr G.E. Fogg; **Treasurer:** Dr M. T. Martin.

   Four nominations had been received for the four vacant offices of **Ordinary Member** - three to serve for two years, and one to serve for one year. The result of the postal ballot was worked out during the course of the meeting by Dr P.S. Dixon and Dr J.K. Spearing, and the Chairman announced that Dr A.J. Brook, Dr R.W. Butcher, and Dr E.W. Jones had been elected to serve for two years, and Dr H. Blackler to serve for one year. All other members of Council were re-elected. (A complete list of members of Council for 1958 is given on p. (ii) of this Bulletin).

Other business:

1. Mr R. Ross reminded members that the **9th International Botanical Congress** would be held at Montreal in the summer of 1959, and all proposals to the nomenclature section should be sent in by September 1958. A number of amendments to the International Rules have already been tabled (see recent numbers of 'Taxon'). Any proposals for conserving algal generic names should be sent soon to Mr Ross who will be glad to help with their presentation; if necessary, our subcommittee for nomenclature would consider proposals before forwarding them to the international body.

2. **Use of Algal Record Cards.** Miss Dorothy Ballantine appealed for more members to help in the scheme of the Check-list & Flora committee to compile up-to-date records of the distribution of marine algae in Britain and Ireland. In two years only two lots of completed record cards had been received from members outside the committee.

3. **Future Field Meetings.** The Secretary remarked that the last Field Meeting had been poorly attended and asked for the views of members on the whole question of Field Meetings. Were we perhaps holding too many such meetings; would one Field Meeting every two years meet with better support? In particular, should we consider dropping the Field Meeting in 1959, because there are several important botanical meetings already planned for that year including the International Botanical Congress in Canada and International Limnological Congress in Austria?

   A majority of those present thought we should try to hold a Field Meeting every year, and that the period August/September was still the most suitable time of year for the meeting. Dr Godward suggested that more joint meetings with other Societies be considered. Several particular coastal areas were suggested for future meetings, and it was remarked that school halls may be available in certain areas where simple laboratory facilities were otherwise lacking. Dr Eifion Jones suggested circulating a questionnaire on the subject of Field Meetings to all members of the Society. The Chairman thanked members for the suggestions and points of view put forward, which would be borne in mind by the Council. (See letter from Dr Eifion Jones on p.   Ed.)

4. **Iconothecae of the algae.** Mr R. Ross remarked that Dr Kufferath (Belgium) had written to him about the advantage to phycologists of building up personal iconothecae (collections of illustrations) of the algae. Dr Kufferath himself had extra prints made of his illustrations and sent them out to colleagues with his reprints - a simple way to help colleagues acquire a collection of illustrations - and had asked Mr Ross to bring this suggestion to the attention especially of people working on the 'minor groups' of algae.

5. **Premium Bonds.** Mrs Joy Etherington suggested that the Society might think about purchasing a few premium bonds, although there might be difficulty about a Society purchasing them. The Chairman commented that this would be considered at the next meeting of Council.

6. **Phycological Society Dinner.** Dr Godward suggested that the Society should consider arranging a Dinner for members in connexion with the annual Winter Meeting. It was agreed to investigate this matter for the next winter meeting.

There being no further business, the Chairman declared the meeting closed at 5.30 p.m.

H.T. POWELL, Hon. Secretary.

BRITISH PHYCOLOGICAL SOCIETY

Income and Expenditure Account for year ended November 1, 1957

Expenditure

	£.	s.	d.
Printing Bulletin 5 (250 copies)	55	10	6
Editor's postage and stationery	1	0	3
Postages and stationery	19	3	3
Filing cabinets and index cards	5	17	10
Institute of Biology - Diary of meetings	1	7	6
Record cards	14	7	3
Subscription to Biological Council (2 years)		10	0
Surplus........	15	15	8
	£113.	12.	3.

Income

	£.	£.	s.	d.
Subscriptions received 1957	103			
Less subscriptions received in arrears 1956	6			
Less subscriptions received for 1958-60	6			
Add subscriptions in arrears for 1957	9	100	0	0
Sale of Bulletins		13	8	9
Sale of Reprints			3	6
		£113.	12.	3.

Balance Sheet at November 1, 1957

Capital and Liabilities

	£.	s.	d.
Capital at November 13, 1956	168	14	2
Subscriptions in advance for 1958-60	6	0	0
	174.	14.	2.
Less 3 subscriptions for 1956 (membership now ceased)	3	0	0
	171.	14.	2.
Add Surplus........	15	15	8
	£187.	9.	10.

Assets

	£.	s.	d.
Balance at Bank	178	9	10
Subscriptions in arrears	9	0	0
	£187.	9.	10.

(Signed) M.T. MARTIN, Hon. Treasurer.

We certify that the above Balance Sheet and Income and Expenditure Account are in accordance with the books and vouchers of the British Phycological Society, which we have duly audited, and in our opinion they give a true and correct view of the transactions of the Society for the period November 2nd, 1956 to November 1st, 1957, and its position at November 1st, 1957.

(Signed) W.T. Williams)
G.C. Ainsworth) Hon. Auditors.

AUTHORS' ABSTRACTS OF PAPERS READ AT QUEEN MARY COLLEGE, LONDON, 2nd & 3rd JANUARY 1958.

1. **Meiosis in** *Spirogyra crassa.* **M.B.E. Godward.**

Meiosis in *Spirogyra crassa* was found in September 1956 after a search which had lasted 10 years. The time taken can be accounted for partly by the failure to keep the species in culture for more than a year without its becoming grossly abnormal; partly by its sporadic occurrence in nature in any of the four habitats found; and partly by the mistakes made in locating the time of meiosis. In this species, though very possibly not in others, meiosis occurred two or three days after fusion of the gametes under the conditions of culture.

The early prophases were difficult and could not be followed in any detail. Diakinesis was clear and showed bivalents with four distinct chromatids and two, three or, rarely, four unterminalized chiasmata. No indication of an undivided structure such as a centromere was found, although what have been called 'interzonal connections' were clear between all four chromatids and attached them in pairs. Terminalization of chiasmata was complete at metaphase. Anaphase I was also clear. The first meiotic division was of the equational type. Non-sister chromatids connected by half-chiasmata passed to the poles of the first anaphase. The division was thus of the kind found in *Luzula*, where it has been attributed to the presence of a so-called 'diffuse' centromere. Since there is no positive evidence for the existence of such a structure the use of this term is, probably, indefensible. A clear spindle was present. It was composed of numerous very coarse spindle fibres. There was at metaphase, diakinesis, and anaphase I, no clear sign of the nucleolar-organizing chromosomes which are so distinct at all stages of mitosis.

Metaphase II and anaphase II, although probably found, could not be followed. It appeared to the writer that after anaphase I there was fragmentation of the chromosomes. Observations on these stages will however be repeated if opportunity occurs.

Photographs and permanent preparations showing metaphase and anaphase I were shown to the Society.

It is the writer's view that genetic evidence of equational first division will not be found, except under unusal circumstances, in any organism in which there are numerous chiasmata. In the present material, up to four chiasmata could be found at diakinesis, probably therefore in earlier stages there were more. Interchanges were observed to involve all four chromatids at successive loci. The difference therefore between equational first division and equational second division could be distinguished only in regard to a small section of chromosome immediately adjoining a centromere, if any centromere existed. Other theoretical considerations come to mind but will not be considered here.

A full account will be published elsewhere. A photograph of half of anaphase I in the form of a lantern slide has been sent to Dr Starr of Bloomington, Indiana, who sent the writer photographs of diakinesis in *Cosmarium*. These were shown by the writer to the Genetic Society here. There is nothing in the original drawings of Karsten and Trondle which conflicts with the observations now made.

2. Chromosome numbers in Ulotrichales and allied groups. Y.S.R.K. Sarma.

Nuclear cytology has been studied in about 20 species belonging to 9 genera of the Ulotrichales and 3 genera belonging to other Orders of Chlorophyceae. Mitosis in *Uronema, Hormidium, Cylindrocapsa,* and a marine species of *Prasiola* has been followed for the first time. Chromosome numbers obtained during this investigation are recorded in Table 1, together with the counts of previous workers. All counts except one are new records, as several of the earlier ones have not been confirmed.

Chromosomes in association with the nucleoli have been observed in *Microspora amoena, Uronema terrestre, Sphaeroplea annulina* and *Ulva lactuca.* They are most probably nucleolar organizing chromosomes.

The chromosomes of Ulotrichales in most cases are extremely minute and dot-like (the smallest being approximately 0.25μ long or probable even less) at metaphase. Those of *Ulothrix zonata* are comparatively large.

The lowest chromosome number here recorded is 10, and the highest c.48. Although there is a very vague suggestion of polyploidy in some species of *Microspora* and *Hormidium,* the chromosome numbers, in general, (cf. Table I) suggest that aneuploidy has played a predominant part in the evolution of the species in Ulotrichales.

Evidence has been obtained for the possible occurrence of cytological races, characterized by different chromosome numbers, in one and the same species (*Microspora amoena* and *Enteromorpha compressa*).

A basis for cytotaxonomy seems to exist in several genera, since different chromosome numbers characterize different species within a genus. The taxonomy of some species was discussed in relation to cytological criteria.

The present cytological investigation has given support to the systematic treatment of the Order Ulotrichales advocated by Fritsch (1935). *Sphaeroplea* has been shown to have more in common in its nuclear cytology with the Ulotrichales than with Cladophorales.

Distinct configurations of meiotic bivalents have been observed in *Ulva lactuca* and *Enteromorpha compressa.* The number of chiasmata at diakinesis is seen to range from one to three depending on the length of the bivalents.

The chromosome numbers of the other three algae investigated are: *Hydrodictyon reticulatum,* 18; *Draparnaldia plumosa,* 18; and *Mougeotiopsis calospora,* 16 - 18.

Polyploidy has been successfully induced for the first time in *Sphaeroplea annulina, Hydrodictyon reticulatum,* and *M. loefgrenii* by employing colchicine. Other effects produced by it in these algae have also been recorded.

Table 1. Chromosome numbers in the Ulotrichales.

Name of species	Present counts	Previous counts
Ulothrix zonata	10	4 (Schussnig, 1930, and Gross, 1931)
U. subtilissima	14	----
U. variabilis	--	7-8 (Cholnoky, 1932a)
U. rorida	--	5 (Lind, 1932)
Uronema barlowi	18	----
U. gigas	18	----
U. confervicolum	16	----
U. terrestre	16	----
Hormidium barlowi	22 - 24	----
Hormidium sp.	c. 22	----
H. crenulatum	44 - 48	----
Cylindrocapsa involuta	16 - 18	----
Microspora amoena 'A'	32	8-12 (Nunstein, 1914)
M. amoena 'B'	20	ditto.
M. loefgrenii	18	14-16 (Kostrun, 1944)
M. aequabilis	24	----
M. stagnorum	16	8-10 (Cholnoky, 1932b)
M. tumidula	16	----
Sphaeroplea annulina var. crassisepta	16	----
Spaeroplea annulina	16	10 (Palik, 1950)
Enteromorpha compressa 'A'	10 Bivalents	(n-10, 2n-20 in *E. compressa* var. *lingulata*)
Enteromorpha compressa 'B'	9 Bivalents	(Ramanathan, 1939)
E. ramulosa	c. 12	----
E. intermedia	c. 16	----
Ulva lactuca	10 Bivalents 10 (= n)	n = 13, 2n = 26 & n = 10 (Foyn, 1934) (Carter, 1926)
U. linza	--	c. 24 - 25 (Levan and Levring, 1942)
Prasiola stipitata	12 - 14	----
P. japonica	--	n = 3 (Fujiyama, 1955)

REFERENCES

CARTER, N., 1926. An investigation into the cytology and biology of the Ulvaceae. *Ann. Bot. Lond.*, **40**, 665-689.

v. CHOLNOKY, B., 1932a. Planogonidien-und Gameten-bildung bei *Ulothrix variabilis* Kg. *Beih. bot. Centrabl.*, **49**, 221-238.

1932b. Beitrage zur Kenntnis der Karyologie von *Microspora stagnorum*. *Z. Zellforsch.*, **16**, 707-722.

FÖYN, B., 1934. Lebenzyklus und Sexualitat der Chlorophycee *Ulva lactuca* L. *Arch. Protistenk.*, **83**, 154-177.

FRITSCH, F.E., 1935. The Structure and Reproduction of the Algae. Vol. I. Cambridge Univ. Press.

FUJIYAMA, T., 1955. On the life-history of *Prasiola japonica* Yatbe. *Jour. Faculty of Fisheries & Animal Husbandry, Hiroshima Univ.*, **1**, 15-36.

GROSS, I., 1931. Entwicklungsgeschichte, Phasenwechsel und Sexualitat bei der Gattung *Ulothrix*. *Arch. Protistenk.*, **73**, 206-234.

KOSTRUN, G., 1944. Entwicklung der Keimlunge und Polaritatsverhalten bei Chlorophycees. *Wiener botanische Zeitschrift*, **93**, 172-221.

LEVAN, A. & LEVRING, T., 1942. Some experiments on C-mitotic reactions with Chlorophyceae and Phaeophyceae. *Hereditas*, **28**, 400-408.

LIND, E.M., 1932. A contribution to the life-history and cytology of two species of *Ulothrix*. *Ann. Bot. Lond.*, **46**, 711-725.

NEUENSTEIN, H., 1914. Uber den Bau Zellkernsbee den Algen und seine Bedeutung fur ihre Systematik. *Archiv. f. Zellforschung.*, **13**, 1-91.

PALIK, P., 1950. *Sphaeroplea*-studien. *Acta. Biol. Acad. Sci. Hungari.*, **1**, 329-361.

RAMANATHAN, K.R., 1939. The morphology, cytology and alternation of generations in *Enteromorpha compressa* (L.) Grev. var. *lingulata* (J. Ag.) Hauk. *Ann. Bot. Lond.*, N.S. **3**, 375-398.

SCHUSSNIG, B., 1930. Die mitotische Kernteilung bei *Ulothrix zonata* Kutz. *Z. Zellforsch.*, **10**, 642-650.

3. Chromosome numbers and life-cycles in members of Cladophorales.

J.P. Sinha.

Cytological investigations have been carried out on *Cladophora*, *Rhizoclonium* and *Chaetomorpha* comprising 25 species collected from different situations. The chromosome numbers obtained in various species are recorded in Table 1:

Table 1. Chromosome counts in the Cladophorales.

Name of Species	Original counts		Previous counts	
	Mitosis	Meiosis	Mitosis	Meiosis
Cladophora (Marine Species):				
1. *C. flexuosa*	2n = 24	n = 12	-	-
2. *C. hutchinsiae*	2n = 24	n = 12	-	-
3. *C. pellucida*	-	n = ±18 (bivalents)	2n = 33? n = 16 approx. (Föyn, 1929)	
4. *C. refracta*	12	-	-	-
5. *C. rupestris*	24	-	-	-
6. *C. (Aeg.) linneae*	2n = 24	n = 12	-	-
(Freshwater Species):				

Table 1 - (Contd.)

Name of Species	Original counts		Previous counts	
	Mitosis	Meiosis	Mitosis	Meiosis
7. *C. glomerata (L.) Kütz.*	48 96	- -	n = 48 2n = 96 (Schussnig, 1954)	- -
8. *C. glomerata* f. *genuina*	72	-	2n = ± 72 (Geitler, 1936)	-
9. *C. glomerata* f. *callicoma*	48	-	-	-
10. *C. glomerata* sub-forma *kutzingiana*	48	-	-	-
11. *C. crispata*	24	-	-	-
12. *C. fracta* var. *normalis*	24	-	n = 12 (Geitler, 1936)	-
Rhizoclonium				
1. *Rh. riparium* (marine)	2n = 36	n = 18	-	-
2. *Rh. riparium* (brackish & freshwater)	2n = 36	-	-	-
3. *Rh. riparium* f. *validum* (brackish)	2n = 24	n = 12	-	-
4. *Rh. riparium* f. *validum* (marine)	24	-	-	-
5. *Rh. implexum* (marine)	24	-	-	-
6. *Rh. tortuosum* (marine)	24	-	-	-
7. *Rh. hookeri* (marine)	18	-	-	-
8. *Rh. hieroglyphicum* (freshwater)	24	-	-	-
9. *Rh. sulfuratum* (freshwater)	48	-	-	-
10. *Rh. profundum* (freshwater)	c. 48	-	-	-
Chaetomorpha				
1. *Ch. aerea* (marine)	18	-	2n = 20 n = 10 (Hartmann, 1929)	
2. *Ch. linum* (marine)	18 36	-	-	-
3. *Ch. capillaris* (brackish)	2n = 36	n = 18	-	-
4. *Ch. capillaris* (marine)	36	-	-	-
5. *Ch. melagonium* (brackish)	18	-	-	-
6. *Ch. aerea* f. *linum* (freshwater)	2n = 36 n = 18	-	-	-
7. *Ch. henningsii* (freshwater)	18	-	-	-

In *Cladophora* (x = 12, x = 18), *C. crispata* and *C. fracta* are diploid, while *C. glomerata* and its forms constitute a polyploid series (x = 12). In *Rhizoclonium* (x = 12, x = 18), two of the freshwater species appear to be tetraploid (x = 12). All the species of *Chaetomorpha* are diploid (x = 18).

There is cytological support for Stockmayer's view that *Rhizoclonium riparium* f. *validum* is a synonym of *Rh. tortuosum*, and that *Rh. riparium* is a distinct species, whether found in freshwater, marine, or brackish situations.

The dimensions of chromosomes and nuclei, and of zoospores and gametes, also appear to offer characters for distinguishing species.

Table 2. Measurements of resting nuclei and chromosomes in the marine species of *Cladophora*.

Name of species	Size of chromosomes at pre-metaphase		Diameter of resting nuclei.
	Length	Breadth	
1. *C. flexuosa*	2 - 5μ	0.5 - 1μ	4 - 4.5μ
2. *C. hutchinsiae*	1.5 - 4μ	0.3 - 0.7μ	3 - 3.5μ
3. *C. pellucida*	2 - 3.5μ	0.5 - 1μ	3 - 4μ
4. *C. refracta*	3 - 5μ	1 - 1.25μ	4 - 4.5μ
5. *C. rupestris*	2 - 3μ	1 - 1.25μ	3 - 4μ
6. *C. (Aeg.) linneae*	0.5 - 2μ	c.0.25μ	2 - 3μ

Table 3. Dimensions of zoospores and gametes in species of *Cladophora* and *Chaetomorpha*.

Name of species	Zoospore		Gamete	
	Length	Breadth	Length	Breadth
1. *C. flexuosa*	21.5 - 24.5μ	10.5 - 13.5μ	16.5 - 17.5μ	9 - 12.5μ
2. *C. hutchinsiae*	13.5 - 15.5μ	10.5 - 12.5μ	10 - 11μ	7 - 8μ
3. *C. refracta*	-	-	12.5 - 13.5μ	8 - 9.5μ
4. *Ch. aerea*	10 - 12μ	6.5 - 8.5μ	8.5 - 8μ	5 - 6μ
5. *Ch. linum*	-	-	8 - 8.5μ	5 - 5.5μ

The three genera, *Cladophora*, *Rhizoclonium* and *Chaetomorpha*, are found to be similar in cytological characters, viz: in the general structure of the resting nucleus, constant occurrence of chromocentre-like bodies, organization of metaphase plates, and the structure of bivalents. The normal mitotic divisions are similar. Chromosomes of variable sizes are easily recognizable. The chromatids are clearly visible at late prophase. Most chromosomes appear to possess either median or sub-median centromeres. The delicate spiral structures have been observed distinctly in early prophase, late propase, anaphase and in telophase. At metaphase, the chromosomes appear thick, rod shaped and organized in a plate which is generally twice the diameter of the resting nucleus.

Meiosis has been found in 4 species of *Cladophora*, 2 species of *Rhizoclonium*, and 2 species of *Chaetomorpha* for the first time; in the genera *Rhizoclonium* and *Chaetomorpha*, occurrence of meiosis has been noted for the first time. Bivalents of these genera show usually at least one or two chiasmata.

The life-history of two marine species of *Cladophora* has been followed. Cytological observations in regard to the life-history have been made in two species of *Rhizoclonium* and four species of *Chaetomorpha*. Isomorphic alternation of generations has been established in the species of Cladophorales I have investigated.

REFERENCES

FÖYN, B., 1929. Vorläufige Mitteilung über die Sexualitat und Generationswechsel von *Cladophora* und *Ulva*. *Ber. Deutsch. Bot. Ges.*, **47**, 495-506.

GEITLER, L., 1936. Vergleichende Untersuchungen über den feineren Kern und chromosomen bau der Cladophoraceen. *Planta*, **35**, 530-578.

HARTMANN, M., 1929. Uber die Sexualitat und den Generationswechsel von *Chaetomorpha* und *Enteromorpha*. *Ber. Deutsch. Bot. Ges.*, **47**, 485-494.

SCHUSSNIG, B., 1954. Gonidiogenese, gametogenese und Meiose bei *Cladophora glomerata* (L.) Kützt. *Arch. Protistenk.*, **100**, 287-332.

STOCKMAYER, S., 1890. Uber die Algengattung *Rhizoclonium*. *Verh. Zool. - Bot. Ges. Wien*, **40**, 571-586.

4. Cytology and conjugation in *Zygnema* and *Mougeotia*.

B.N. Prasad.

Cytological observations have so far been made on 12 species of *Zygnema* and 5 species of *Mougeotia*. The interphase nucleus has a distinct outer membrane, one or more nucleoli, and chromatin appearing like fine granules or threads. Chromocentre-like bodies may or may not be present according to the species, but their number is often variable even within nuclei of the same filament. Occasionally, even in the interphase, it is possible to see tortuous and coiled tracks within the nucleolus. These are, in all probability, the tracks of nucleolar-organizing chromosomes.

At the onset of prophase, the nucleolus is usually the first to disintegrate; the nuclear membrane dissolves, the nucleus swells up markedly and the chromosomes appear - sometimes showing distinct discontinuous staining. Chromosomal condensation continues until metaphase when, in most species of *Zygnema*, the chromosomes appear dot-like and, in all species of *Mougeotia* examined, are sausage-shaped. The smallest size of chromosomes met with so far is 0.25 μ at metaphase.

In the majority of species, the chromosomes show a pronounced stickiness with each other due to the presence of material presumably derived by the disintegration of the nucleolus. At metaphase, the spindle appears well organized and usually the fibres are clearly seen. In some species of *Mougeotia* it appears to be intranuclear. In most species of *Zygnema* it is not possible to say whether the disjunction of chromatids is parallel or otherwise, due to their dot-like shape, but in species with comparatively long chromosomes it can be inferred from the anaphase that the centromere is terminal or sub-terminal.

Besides cytological studies, some investigation has been made of the sexual behaviour of a species of *Zygnema*. Zygospores of *Z. cruciatum* were dissected out of their parent cells and plated on 1% agar gel made up in Godward's (1942) solution plus soil-extract. On germination after a few weeks, the germlings were isolated and clonal cultures set up. Vegetative filaments were mixed in combinations of two clones each and were placed in a depleted medium in watch-glasses resting on glass triangles within petri-dishes. Half of the dishes contained a 5% solution of sodium bicarbonate providing a CO_2-rich atmosphere. Some of the dishes were placed in a low-temperature cabinet receiving daylight, some in a north-facing window at room temperature, and a third batch in a culture-cabinet receiving artificial light. Controls with single clones were also set up similarly.

At the end of a few weeks, zygospores were formed in all the dishes (including controls), except those in the cool cabinet. The species, therefore, is self-fertile. Presence of added CO_2 does not seem to affect conjugation, since zygospores were formed in equal abundance in dishes without a CO_2-enriched atmosphere. Low temperature does not seem to favour conjugation as shown by the absence of the process in all of the dishes in the cool cabinet.

Reference:

GODWARD, M.B.E., 1942. The life-cycle of *Stigeoclonium amoenum* Kütz. *New Phytol.*, **41**, 293-301.

5. Nuclear divisions in the Euglenineae: a new form of mitosis. G.F. Leedale.

A cytological study of 40 species of the Euglenineae, drawn from 15 genera, has shown that nuclear division in this group is a true mitosis. Individualized chromosomes duplicate themselves longitudinally, and sister chromatids segregate to opposite poles.

The mitosis differs from that in higher organisms in the following ways:

1. The endosome (nucleolus?) persists throughout mitosis, dividing as a structure distinct from the chromosomes, and retaining its contained ribonucleic acid.
2. There is no organized, fibrillar spindle; and there are no localized centromeres or polycentromeres.
3. The mitosis is unaffected by colchicine and by ionizing radiations up to a dosage of 100,000 r.
4. There are no centrioles or centrosomes; the basal granules of the flagella do not act as division centres.
5. The chromatin threads become arranged more or less parallel to the division axis at metaphase. In some species the threads are segregating chromatids, in others they are chromosomes which will duplicate in their parallel position, the chromatids segregating in anaphase.
6. The separation and anaphase movement of the chromatids is staggered.
7. There are four main chromatid shapes during anaphase; rods, curves, and U-shapes towards or away from the poles.
8. The nuclear membrane persists throughout mitosis.

9. The duration of the mitosis is from 2 to 4 hours. Anaphase lasts from 35 to 86 minutes in different species as compared with 1 to 20 minutes in all other organisms and tissues for which records exist.

10. The absolute velocity of the chromatids separating at anaphase is less than 0.1μ per minute at 20°C. compared with 0.3 to 6.0μ per minute for all other recorded material.

In the absence of centrioles, centrosomes, blepharoplasts, centromeres and spindle, my conclusion is that the daughter chromosomes move apart in an autonomous manner, their movement being governed only by their mutual repulsion. This repulsion begins in prophase or metaphase and leads to anaphase.

A continuous repulsion between sister chromatids will ensure their incorporation into different nuclei. The dense nucleoplasm and the retention of the nuclear membrane prevents a scattering of the chromatids in the cell and finally results in the repelling chromatids becoming marshalled into two groups. The nuclear membrane becomes stretched as the groups move apart, and finally meets between them to separate the nuclear material into two daughter nuclei which are cytologically and genetically identical.

This theory is independent of division centres, spindle or centromeres; it is dependent on the retention of the nuclear membrane during mitosis; and with it one would expect complicated division figures and a staggered anaphase. The low chromatid velocity and the long anaphase are thought to be an indication of a fundamentally different mitotic mechanism of this kind.

6. Two desmid rubbish dumps, *Staurastrum paradoxum* and *S. gracile*. A.J. Brook.

Reference to the literature on British freshwater phytoplankton in which desmids have been recorded indicates that the two most constantly occurring species are *Staurastrum paradoxum* and *S. gracile*. The examination of plankton collections, however, from a very large number of bodies of freshwater of widely different trophic types, from all parts of the British Isles, has shown that none of the *Staurastrum* species present can really be referred to either of these taxa. This is not very surprising in the case of *S. paradoxum* for the original description and illustrations of this species are most inadequate and, furthermore, no type material exists. On the other hand, various authorities including Ralfs (1848), West and Carter (1923) and G.M. Smith (1924), as well as many others have hazarded guesses (and given illustrations) as to its probable identity, so that at the present time almost any radiate *Staurastrum* with well developed processes and having no very prominent ornamentation on the semicell body could be given the epithet *paradoxum*. The examination of these authorities' figures coupled with a detailed study of plankton samples, some of which has been of original material, from the large number of British lakes from which this 'species' has been recorded, suggests that at least five clearly defined species and one variety have been named as *S. paradoxum*. These are, a form of *S. anatinum* with reduced body ornament (= *S. anatinum* f. *paradoxum* Brook), *S. cingulum*, and the var. *obesum*, *S. chaetoceras*, *S. longipes*, and *S. pingue*. It is proposed that the name *S. paradoxum* should be abandoned, i.e. it should become a "nomen desertum".

Somewhat similar confusion exists in the case of *S. gracile*, though it has been possible to establish its true identity by examining type material from the Jenner

Herbarium of the British Museum. This does not agree exactly with the figures in Ralfs's monograph (1848), the type material indicating a squat, benthic species with parallel or even convergent processes, while later authorities (e.g. West and Carter, 1923, and G.M. Smith, 1924) have depicted a planktonic desmid with slender, somewhat elongated body and long divergent processes. The nearest planktonic relative of *S. gracile* is undoubtedly *S. cingulum* and further research may well show that the latter should be reduced in rank to a variety or form of *S. gracile*, for many intermediate forms have been found in various collections. Another group of the genus *Staurastrum* which has been frequently referred to in the literature as *S. gracile* are the planktonic forms of *S. manfeldtii*. Some nine benthic taxa including forms of *S. borgeanum* and *S. proboscidium* are probably synonomous with *S. gracile*.

From the ecological standpoint, the separation of a number of well defined taxa from the two ill defined 'species', *S. paradoxum* and *S. gracile* is most important. Many authorities seem to have regarded these "rubbish heaps" as cosmopolitan species occurring throughout the trophic range, whereas in fact the individual taxa which can be separated from them would seem to be constantly associated with certain types of waters and there is no proof as yet that these are cosmopolitan.

REFERENCES

RALFS, J., 1848. The British Desmidieae. London. 226 pp.

SMITH, G.M., 1924. Phytoplankton of the Inland Lakes of Wisconsin II. *Bull. Univ. Wisc.*, No. 1270, 1 - 227.

WEST, G.S. and CARTER, 1923. British Desmidiaceae, Vol. V. London, Ray Society.

7. Nuclear structure and classification in the Fucales.

Margaret Naylor.

Chromosome counts appear to be of little value in the cytotaxonomy of the Fucales as almost all the counts so far recorded give either a haploid value of n = 32 or a diploid value of n = 64. Further counts by the author indicate that in *Halidrys siliquosa* (L.) Lyngb. and *Himanthalia elongata* (L.) S.F. Gray the number in the vegetative thallus is also of the order of 60.

It is possible that the structure of the resting nucleus may have taxonomic value. In 1912, le Touzé recorded two types of nuclear structure in members of the Fucales. He called the two types "uninucleote" and "granular", and believed them to be of systematic value, the former characteristic of the Fucaceae, the latter of the Cystoseiraceae. Further observations on resting nuclei were made by Roy (1938) on six members of the Fucaceae and six of the Cystoseiraceae. She found that whereas all the Fucaceae investigated possessed uninucleolate nuclei, not all members of the Cystoseiraceae possessed granular nuclei. *Halidrys siliquosa, Bifurcaria rotunda* (Huds.) Papenf. and *Cystoseira tamariscifolia* (Huds.) Papenf. all possessed granular nuclei, whilst *C. foeniculacea* (L.) Grev., *C. myriophylloides* Sauv. and *C. granulata* (L.) Ag. did not. She also stressed that the detailed structure of the nucleus was not constant throughout any one plant, considerable variation being seen in the number and size of the granules.

These observations of Roy have been confirmed by the present author and extended to one further British species of Cystoseira, *C. baccata* (Gmel.) Silva, which also lacks granules in the nucleus.

Detailed analysis of the nuclei of *Halidrys siliquosa* (Naylor, *Ann. Bot.*, in press) indicates that the granules are probably chromocentres. They give a positive reaction with Feulgen's reagent; they vary in number between cells of the same tissue; their number is independent of the chromosome complement, whether haploid or diploid, and bears no numerical relationship to the chromosome number.

Obviously presence or absence of chromocentres can have no broad application in classification, as originally suggested by le Touzé. It is not necessarily a generic character, although apparently so in Halidrys. *Halidrys dioica* Gardner also possesses chromocentres, but they are smaller and more numerous than in *H. siliquosa*.

In the genus Cystoseira the position is very variable, and probably the nuclear types form a continuous series. Cystoseira is a genus in which active speciation is possibly still taking plate (Ercegović, 1952), and the nuclear structure may be of value in confirming relationships between species. Analysis shows that closely related species such as *C. tamariscifolia* and *C. spicata* Ercegović (granular) on the one hand, and *C. foeniculacea* and *C. discors* (L.) Ag. (non-granular) on the other, possess the same kind of nucleus.

REFERENCES

ERCEGOVIĆ, A., 1952. Sur les Cystoseira adriatiques. Fauna et Flora Adriatica, Vol. II. Split.

le TOUZÉ, H., 1912. Contribution à l'étude histologique des Fucacées. *Rev. gén. Bot.*, **24**, 33.

NAYLOR, M. (In press). The cytology of *Halidrys siliquosa* (L.) Lyngb.. *Ann. Bot.*

ROY, K., 1938. Recherches sur la structure du noyau quiescent et sur les mitoses somatiques de quelques Fucacées. *Rev. Algol.*, **11**, 101.

8. Observations on the development and cytology of *Himanthalia elongata* (L.) S.F. Gray.

Betty Moss.

Growth of the vegetative button during the first season is slow and nuclear divisions are infrequent. During April and May of the second year's growth the receptacles elongate rapidly and dividing nuclei are abundant in the meristoderm, in the basal cells of paraphyses and beneath the apical cell. Resting nuclei are approximately 5μ in diameter and have a granular structure. At late prophase the chromosomes are well dispersed and counts of 28 and 46 have been recorded.

On the coast of Northumberland, gametes are differentiated towards the end of June, and thereafter there is a continuous production of gametes in the same conceptacles until the end of the year. The first two nuclear divisions in the oogonium take place before the initial cell has enlarged and can be distinguished from the other cells lining the conceptacle wall. The oogonium reaches a size of about 0.25 mm. in diameter before the third nuclear division. By the time that the oosphere is ready for shedding it contains only one centrally placed nucleus approximately 20μ in diameter. In the antheridium, nuclear divisions follow in quick succession until 64 nuclei, each about 1.5μ in diameter, are formed. Counts of 34, 28, 26 and 24 chromosomes have been recorded at the third and fourth metaphases.

Oospheres are shed in a thick mucilaginous envelope from which they subsequently squeeze out and round off. Germination, following the mixing of gametes in culture, is slow. The first two divisions result in the formation of a tetrad of small nuclei in the centre of the oospore. Not until after the following division do the nuclei move out and become equally dispersed in the granular cytoplasm. Cell walls are not formed until after the third or fourth nuclear division. This period of free nuclear division in *Himanthalia* is very different from the early stages in the embryology of other British members of the Fucales.

9. The morphology, ecology and taxonomy of certain Florideae. **Peter S. Dixon.**

The external form of the thallus is the principal feature used for taxonomic discrimination in the Florideae. Much of the present taxonomic chaos in that group results from the failure to recognize and interpret the seasonal and environmental modifications of external form. Before such interpretations can be undertaken, the way in which the form of the thallus comes into being must be known. Information on the processes involved is at present very scanty. The structure of the mature thallus as seen in transverse and longitudinal section and the segmentation of the principal apical cells of the thallus comprise our total knowledge for many genera of the Florideae.

There are certain basic morphological concepts which must be considered in any discussion of morphogenesis in the Florideae.

1. The thalli of the Florideae are built up by the aggregation of filaments, which result from the activity of apical cells. Intercalary cell-divisions occur only in certain genera of the Delesseriaceae.

2. Of these filaments, a few, which constitute the major axes of the thallus, are of unlimited growth, whilst the majority, of limited growth, constitute the cortical investment of the major axes.

3. A pit-connection is formed each time an apical cell divides. From a consideration of the positions of pit-connections in a mature thallus, it is possible to deduce the pattern of segmentation by which it has arisen.

4. The external form of the thallus is determined by:-
   a. The position, number and manner of formation of the lateral branches of unlimited growth, which constitute the major axes of the thallus.
   b. The form of the major axes of the thallus, which is determined by the balance of cell-division and cell-enlargement between the apical cell of the lateral branch of unlimited growth and the apical cells of its associated lateral branches of limited growth.
   c. The life-span of the frond.

The application of these basic concepts will be considered in relation to certain notoriously polymorphic species.

Grateloupia filicina (Wulf.) Ag.

The range of form in relation to season was investigated by the examination of marked specimens at intervals throughout the year. The multiaxial thalli are annual and arise in spring. The primary axis undergoes one or two dichotomies, but adventitious lateral branches of unlimited growth develop during the summer and autumn to give a pinnate appearance to the thallus. The spring form of this species corresponds to the entity described previously as *Grateloupia minima* Crn. The seasonal change of appearance results from the secondary formation of adventitious lateral branches of unlimited growth.

Pterocladia pinnata (Huds.) Papenf.

The thalli of this species are perennial, persisting for a number of years. Each year, in the spring, primordia arise from the tips of the axes of the existing fronds or from the creeping prostrate axes, and these primordia grow out to form the annual increments which at first are narrow and elongate. During the autumn, the balance of growth changes, apical extension ceases and the axes slowly broaden, reaching their maximum breadth by January. This process is repeated for a number of years, the older lateral axes falling away to give a dendroid appearance to the frond. The narrow-tipped spring form and the broad winter form have been regarded as different varieties (var. *capillaceum*, and var. *pinnatum*, respectively) or even different species. In *P. pinnata*, the seasonal variation of external form is correlated with changes in the balance of cell-division and cell-enlargement.

Gelidium sp. (? corneum).

This species comprises all the previously described British 'species' of the genus in which the thallus is distinctly flattened. The variation of external form can be correlated with the position in which the species is growing on the shore. The thalli exposed in the littoral region increase in size down the shore from mid-tide level to that of low-water of spring tides. The upper specimens are small and little branched whilst the lowermost specimens are large and luxuriantly branched (= *G. attenuatum*). In shallow pools in the littoral region, the thalli tend to be short and relatively broad (= *G. latifolium*).

Gelidium sp. (? filicinum).

The variation in external form is most complicated in this species where the effects of season and environment interact. As in the previous species, the size of the thallus and the degree of branching increase from the level of mid-tide to the level of low-water of spring tides. The tips of the axes tend to be narrow and attenuate in summer and spathulate in winter as a result of changes in the balance of cell-division and cell-enlargement. Numerous names have been given by previous authors to the various entities resulting from the interaction of these two effects. The species includes the following supposed 'species' of *Gelidium*:- *G. pulchellum; G. pusillum; G. crinale; G. spathulatum; G. pulvinatum.*

CHROMOSOME NUMBERS IN THE ALGAE

This list is the first of a short series in which it is proposed to bring together records of chromosome numbers in the major groups of the Algae. The series is being produced in the hopes that other workers will offer additions and emendations: any such additional information will be welcomed by the various authors.

I. PHAEOPHTYA

ECTOCARPALES

Species	*n*	*2n*	*Authority*
Ectocarpus siliculosus (Dillw.) Lyngb. *	8 8 c.9	16 16 -	Knight, 1929. May, 1930. Papenfuss, 1935.
(sub. *E. penicillatus* (Ag.) Kjellm.)	8	16	Knight, 1929.
Ectocarpus fasciculatus Harv.	-	16	Knight, 1929.
Giffordia mitchellae (Harv.) Hamel (sub. *Ectocarpus virescens* Thuret)	not >10	-	Svedelius, 1928; 1929.
Herponema velutinum (Born.) Hamel (sub. *Ectocarpus velutinus* Grev.)	8	16	Knight, 1929.
Pylaiella littoralis (L.) Kjellm.	9 or 10 12	- 24	Knight, 1925. Dammann, 1930.
Spongonema tomentosum (Huds.) Kütz (sub. *Ectocarpus tomentosus* (Huds.) Lyngb.)	-	16	Knight, 1929.
Hapterophycus canaliculatus S. & G.	c. 12	c. 24	Hollenburg, 1947.
Heterochordaria abietineae (Rupr.) Setch.	-	c. 40	Abe, 1936.
Myriogloia sciurus (Harv.) Kuck.	8 or 9	16 - 18	Parke, 1933.

DICTYOSIPHONALES

Species	*n*	*2n*	*Authority*
Isthmoploea sphaerophora (Carm.) Kjellm.	8	16	Knight, 1929
Stictyosiphon griffithsianus (Le Jol.) Holm et Batt. (sub. *Phloeospora brachiata* Born.)	10	-	Mathias, 1935.
Stictyosiphon tortilis (Rupr.) Reinke	c. 26	45 +	Naylor (in the press.)
Myriotrichia clavaeformis Harv.	8	16	Knight, 1929.
Punctaria plantaginea Grev.	8	16	Knight, 1929.

* See Kornmann, 1956 for reasons for separating *E. siliculosus* (Dillw.) Lyngb. and *E. confervoides.* (Roth.) Le Jol.

Species	*n*	*2n*	*Authority*
Asperococcus fistulosus (Huds.) Hook.	8	16	Knight, 1929.
Dictyosiphon foeniculaceus (Huds.) Grev.	18	-	Abe, 1940.
TILOPTERIDALES			
Haplospora globosa Kjellm.	28 - 30	-	Nienburg, 1923.
	c. 12	c. 24	Dammann, 1930.
CUTLERIALES			
Cutleria multifida (Sm.) Grev.	24	48	Yamanouchi, 1912.
Zanardinia prototypus Nardo. (sub. *Z. collaris* Crn.)	22	44	Yamanouchi, 1913.
SPOROCHNALES			
Sporochnus pedunculatus (Huds.) Ag.	20	-	Magne, 1953 (b)
LAMINARIALES			
Chorda filum (L.) Stackh.	20	-	Kylin, 1918.
Laminaria angustata Kjellm.	22	-	Nishibayashi & Inoh, 1956.
Laminaria digitata (Huds.) Lamour.	13	26	Magne, 1953 (a)
(sub. *L. flexicaulis* Le Jol).	8	16	Walker, 1954.
	27 - 31	-	Naylor, 1956.
Laminaria hyperborea (Gunn.) Foslie (sub. *L. cloustonii* Edm.)	-	22	Walker, 1954.
Laminaria japonica Aresch.	22	-	Abe, 1939.
Laminaria ochroleuca la Pylaie	27 - 31	-	Naylor, 1956.
Laminaria saccharina (L.) Lamour.	13	-	Magne, 1953 (a)
	27 - 31	-	Naylor, 1956.
Costaria costata (Turn.) Saunders	c. 30	-	Nishibayashi & Inoh, 1957.
Macrocytis integrifolia Bory.	-	32	Walker, 1952.
Pterygophora californica Rupr.	13	26	McKay, 1933.
Undaria pinnatifida (Harv.) Sur.	22	-	Inoh & Nishibayashi, 1954; 1955.
Eisenia arborea Aresch.	15	30	Hollenburg, 1939.
Egregia menziesii (Turn.) Aresch.	8	16	Myers, 1938.

SPHACELARIALES

Species	*n*	*2n*	*Authority*
Sphacelaria bipinnata (Kütz.) Sauv.	12 - 16	-	Clint, 1927.
Halopteris filicina (Grat.) Kütz.	16	32	Knight, 1929.
Halopteris scoparia (L.) Sauv.	16	32	Higgins, 1931.
(sub. *Stypocaulon scoparium* (L.) Kütz.)	16	32	Knight, 1929.

DICTYOTALES

Dictyota dichotoma (Huds.) Lamour.	16	30 - 34	Williams, 1904.
Padina pavonia (L.) Lamour.	16	-	Carter, 1927.

FUCALES

Fucus vesiculosus L.	10	20	Farmer & Williams, 1896.
	-	26 - 28	Farmer & Williams, 1898.
	-	30	Strasburger, 1897.
	32	64	Yamanouchi, 1909.
Fucus evanescens Ag.	32	-	Inoh, 1935.
Pelvetia wrightii Yendo	32	-	Inoh, 1935
Himanthalia elongata (L.) S.F. Gray	-	c. 60	Naylor, 1957.
Cystophyllum crassipes (Mert.) J.Ag.	-	64	Inoh, 1944.
Cystophyllum sisymbrioides (Turn.) J.Ag.	32	-	Shimotomai, 1928.
Cystoseira barbata (Good. & Woodw.) Ag.	18 - 20	-	Nienburg, 1910.
Halidrys siliquosa (L.) Lyngb.	8	-	Moss & Elliot, 1957.
	c. 30	c. 55	Naylor (in the press.)
Hizikia fusiformis Okamura.	32	-	Inoh & Hiroe, 1954 (b)
Coccophora langsdorfii (Turn.) Grev.	32	-	Tahara, 1929
	-	64	Tomita, 1932.
Sargassum confusum Ag.	32	-	Abe, 1933.
Sargassum enerve Ag.	c. 30	-	Tahara & Shimotomai, 1926.
Sargassum horneri (Turn.) Ag.	16	32	Kunieda, 1928.
	32	-	Okabe, 1929.
	-	64	Okabe, 1930
	32	-	Inoh & Hiroe, 1954 (d)

Species	*n*	*2n*	*Authority*
Sargassum patens Ag.	-	64	Inoh & Hiroe, 1954(e)
Sargassum piluliferum Ag.	32	-	Inoh & Hiroe, 1954(c)
	-	64	Inoh & Hiroe, 1954(a)
Sargassum tortile Ag.	32	-	Inoh & Hiroe, 1956.
Hormosira banksii (Turn.) Decaisne	12	24	Osborn, 1949.

REFERENCES

Abe, K., 1933. Mitosen in Antheridium von *Sargassum confusum*. *Sci. Rep. Tôhoku Univ.* 4 Ser., **8**, 259.

Abe, K., 1936. Kernphasenwechsel von *Heterochordaria abietineae*. *Sci. Rep. Tôhoku Univ.* 4 Ser., **11**, 239.

Abe, K., 1939. Mitosen im Sporangium von *Laminaria japonica* Aresch. *Sci. Rep. Tôhoku Univ.* 4 Ser., **14**, 327.

Abe, K., 1940. Meiotische Teilung von *Dictyosiphon foeniculaceus*. *Sci. Rep. Tôhoku Univ.* 4 Ser., **15**, 317.

Carter, P.W., 1927. The life history of *Padina pavonia*. 1. The structure and cytology of the tetrasporangial plant. *Ann. Bot.*, **41**, 146.

Clint, H.B., 1927. The life history and cytology of *Sphacelaria bipinnata*. *Publ. Hartley Bot. Lab.*, **3**.

Damman, H., 1930. Entwicklungsgeschichtliche und zytologische Untersuchungen an Helgoländer Meeresalgen. *Wiss. Meeresuntersuch. Abt. Helgoland. N.F.* **18**, **4**.

Farmer, J.B. & Williams, J.L., 1896. On Fertilisation and segmentation of the spore in *Fucus*. *Ann. Bot.*, **10**, 479.

Farmer, J.B. & Williams, J.L., 1898. Contributions to our knowledge of the Fucaceae: their life history and cytology. *Phil. Trans. Roy. Soc. Lond. B*, **140**, 623.

Higgins, E.M., 1931. A Cytological investigation of *Stypocaulon scoparium* (L) Kütz., with special reference to the unilocular sporangia. *Ann. Bot.*, **45**, 350.

Hollenberg, G.J., 1939. Culture studies of marine algae. I. *Eisenia arborea*. *Amer. J. Bot.*, **26**, 34.

Hollenberg, G.J., 1947. Culture studies of marine algae. II. *Hapterophycus canaliculatus* S & G., *Amer. J. Bot.*, **28**, 677.

Inoh, S., 1935. Embryological studies on *Pelvetia wrightii* Yendo and Fucus evanescens Ag.. *J. Fac. Sci. Hokkaido Univ.* 5 Ser., **5**, 9.

Inoh, S., 1944. Embryological studies on Turbinaria and Cystophyllum. *J. Fac. Sci. Hokkaido Univ.* 5 Ser., **5**, 199.

Inoh, S. & Hiroe, M., 1954 a. Cytological studies on the Fucaceous plants. I. On the somatic mitosis in the embryo of *Sargassum piluliferum* C.Ag.. *La Kromosomo*, **21**, 760.

Inoh, S. & Hiroe, M., 1954 b. Cytological studies on the Fucaceous plants. II. On the meiotic division in the antheridium of *Hizikia fusiformis Okamura*. *La Kromosomo*, **21**, 764.

Inoh, S. & Hiroe, M., 1954 c. Cytological studies on the Fucaceous plants. III. On the meiotic division in the antheridium of *Sargassum piluliferum* C.Ag.. *La Kromosomo*, **21**, 767.

Inoh, S. & Hiroe, M., 1954 d. Cytological studies on the Fucaceous plants. IV. On the meiotic division in the antheridium of *Sargassum horneri*(Turn.) Ag.. *Bot. Mag.*, **47**, 190.

Inoh, S. & Hiroe, M., 1954 e. Cytological studies on the Fucaceous plants. V. On the mitotic division in the embryo of *Sargassum patens* C.Ag.. *Biol J. Okayama Univ.*, **2**, 1.

Inoh, S. & Hiroe, M., 1956. Cytological studies on Fucaceous plants. VI. On the the meiotic division in the antheridium of *Sargassum tortile* C.Ag.. *La Kromosomo*, **27-28**, 942.

Inoh, S. & Nishibayashi, T., 1954. On the mitosis in the sporangium of *Undaria pinnatifida* (Harv). Sur.. *Biol. J. Okayama Univ.*, **1**, 217.

Inoh, S. & Nishibayashi, T., 1955. On the mitosis in the sporangium of *Undaria pinnatifida* (Harv.) Sur.. *La Kromosomo*, **22-24**, 788.

Knight, M., 1925. Studies in the Ectocarpeae. I. The life-history and cytology of *Pylaiella littoralis*. *Trans. Roy. Soc. Edin.*, **53**, 343.

Knight, M., 1929. Studies in the Ectocarpaceae. II. The life-history and cytology of *Ectocarpus siliculosus*. *Trans. Roy. Soc. Edin.*, **56**, 307.

Kornmann, P., 1956. Über die Entwicklung einer *Ectocarpus confervoides*-Form. *Pubbl. Staz. Zool. Napoli*, **28**, 32.

Kunieda, H., 1928. Development of the sexual organs and embryogeny in *Sargassum horneri*. *J.Coll. Agric. Tokyo*, **9**, 383.

Kylin, H., 1918. Studien über die Entwicklungsgeschichte der Phaeophyceen. *Svensk. Bot. Tidsskr.*, **12**, 1.

McKay, H.H., 1933. The life history of *Pterygophophora californica*. *Univ. Calif. Pub. Bot.*, **17**, 111.

Magne, F., 1953 a. Méiose et nombre chromosomique chez les Laminariaceae. *C.R. Acad. Sci.*, **236**, 515.

Magne, F., 1953 b. La méiose chez les *Sporochnus pedunculatus* C.Ag.. *C.R. Acad. Sci.*, **236**, 1596.

Mathias, W.T., 1935. The life history and cytology of *Phloeospora brachiata*. *Publ. Hartley Bot. Lab.*, **13**.

May, V., 1930. *Ectocarpus confervoides*(Roth) *le Job.*. *Proc. Linn. Soc. N.S.W.*, **64**, 537.

Moss, B.L. & Elliot, E., 1957. Observations on the cytology of *Halidrys siliquosa* (L)Lyngb.. *Ann. Bot.* N.S., **21**, 143.

Myers, M.F., 1928. The life history of the brown alga *Egregia menziesii*. *Univ. Calif. Publ. Bot.*, **14**, 225.

Naylor, M., 1956. Cytological observations on three British species of *Laminaria:* a preliminary report. *Ann. Bot.* N.S., **20**, 431.

Naylor, M., 1957. An Acetocarmine squash technique for the Fucales. *Nature, Lond.*, **180**, 46.

Naylor, M. Some aspects of the life history and cytology of *Stictyosiphon tortilis* (Rupr.)Reinke. *Acta Adriatica.* (in the press).

Naylor, M. The cytology of *Halidrys siliquosa*(L)Lyngb.. *Ann. Bot.*. (in the press).

Nienburg, W., 1910. Die Oogonentwicklung bei *Cystoseira* und *Sargassum. Flora,* **101**, 167.

Nienburg, W., 1923. Zur Entwicklungsgeschichte der Helgoländer *Haplospora. Ber. d. d. Bot. Gesell.,* **41**, 211.

Nishibayashi, T. & Inoh, S., 1956. Morphogenetical studies in the Laminariales. I. The development of zoosporangia and the formation of zoospores in *Laminaria angustata* Kjell.. *Biol. J. Okayama Univ.,* **2**, 147.

Nishibayashi, T. & Inoh, S., 1957. Morphogenetical studies in the Laminariales. II. The development of zoosporangia and the formation of zoospores in *Costaria costata* (Turn.)Saunders. *Biol. J. Okayama Univ.,* **3**, 169.

Okabe, S., 1929. Meiosis im Oogonium von *Sargassum horneri* (Turn.)Ag.. *Sci. Rep. Tôhoku Univ.* 4 Ser., **4**, 661.

Okabe, S., 1930. Mitosen in keimenden Embryo von *Sargassum horneri* (Turn.)Ag.. *Sci., Rep. Tôhoku Univ.* 4 Ser., **4**, 757.

Osborn, J.E.M., 1949. The structure and life history of *Hormosira banksii* (Turn.) Decaisne. *Trans. Roy. Soc. N.Z.,* **77**, 47.

Papenfuss, G.F., 1935. Alternation of generations in *Ectocarpus siliculosus. Bot. Gaz.,* **96**. 421.

Parke, M.B., 1933. A contribution to knowledge of the Mesogloiaceae and associated families. *Publ. Hartley Bot. Lab.,* **9**.

Shimotomai, N., 1928. Karyokinese im Oogonium von *Cystophyllum xsisymbrioides* J.Ag.. *Sci. Rep. Tôhoku Univ.* 4 Ser., **3**, 577.

Strasburger, E., 1897. Kernteilung und Befruchtung bei *Fucus. Jahrb. wiss. Bot.,* **30**, 351.

Svedelius, N., 1928. On the number of chromosomes in the two different kinds of sporangia of *Ectocarpus virescens. Svensk Bot. Tidsskr.,* **22**, 289.

Svedelius, N., 1929. On the number of chromosomes in the two different forms of *Ectocarpus virescens* Thuret. *Proc. Int. Congr. Plant Sci.,* **1**, 259.

Tahara, M., 1929. Ovogenesis in *Coccophora langsdorfii*(Turn.)Grev.. *Sci. Rep. Tôhoku Univ.* 4 Ser., **4**, 551.

Tahara, M. & Shimotomai, N., 1926. Mitosen bei *Sargassum. Sci. Rep. Tôhoku Univ.* 4 Ser., **1**, 189.

Tomita, K., 1932. Befruchtung und Kernteilung bei *Coccophora langsdorfii. Sci. Rep. Tôhoku Univ.* **7**, 43.

Walker, F.T., 1952. Chromosome number of *Macrocystis integrifolia* Bory.. *Ann. Bot.* N.S., **16**, 23.

Walker, F.T., 1954. The chromosome number of *Laminaria digitata*. *Ann. Bot. N.S.*, 18, 112.

Williams, J.L., 1904. Studies in the Dictyotaceae. I. The cytology of the tetrasporangium and germinating tetraspore. *Ann. Bot.*, **18**, 145.

Yamanouchi, S., 1909. Mitosis in *Fucus*. *Bot. Gaz.*, **47**, 173.

Yamanouchi, S., 1912. The life history of *Cutleria*. *Bot. Gaz.*, **54**, 441.

Yamanouchi, S., 1913. The life history of *Zanardinia*. *Bot. Gaz.*, **56**, 1.

Dept. of Botany,
University of Hull,
Yorks.

Margaret Naylor.

FIELD MEETINGS OF THE SOCIETY

At the meeting of the Society in January 1958 a number of opinions were expressed on the subject of field meetings. It seems that an attempt to compare the views of all interested members would be valuable in arranging future meetings, and it is hoped to prepare a digest of this information which may be considered by Council. If all members who have attended field meetings or may attend them in the future, or are in any way interested, will write to me at the address below, I will prepare a summary. The topics on which members are asked to give their personal opinions include:

1) the dates they would find most convenient for field meetings, and any dates which would be impossible;

2) whether they would prefer meetings annually or every two years;

3) whether they would be able to attend a meeting in 1959 (the year of the Internation Botanical Congress in Montreal and the International Limnological Congress in Austria);

4) whether they would attend a meeting which was exclusively marine or exclusively freshwater; and

5) any places where they would recommend that meetings should be held in the future.

It is hoped that all members will write in the next few months so that a complete picture may be obtained.

Marine Biology Station,
Menai Bridge,
Anglesey.

W. Eifion Jones.

REVIEWS

TAYLOR, WILLIAM RANDOLPH, **Marine Algae of the Northeastern Coast of North America.** 2nd. Edition, pp. viii + 509, 60 pls. University of Michigan Press, Ann Arbor, 1957. Price $12.50.

The first edition of this work is well-known to phycologists in the British Isles, although it has been unobtainable for a number of years. The demand has called for a second, revised, edition, and this differs in a number of respects from the original.

Professor Taylor has retained the general plan of the first edition. The introduction, of 24 pages, gives an account of the area surveyed, the general patterns of geographical distribution and ecology, some techniques of collection and preservation and an historical account of the growth of phycology in northeastern North America, whilst the descriptive catalogue of the flora occupies some 320 pages and forms the bulk of the work. The systematic list of the entities recognised is of considerable value, particularly to the non-American phycologist. For the use of the beginner, a series of keys has been provided which are clear and concise, although it is questionable whether differences in the development of the carposporophyte are of use for practical purposes in identification of the Rhodophyceae.

Some of the species described in the first edition have been reduced to synonyms, and one of them, *Chlorochytrium gloeophilum,* seems to have disappeared without trace. On the other hand, certain species recently discovered in the area have been included in the second edition, and the number of species now recognised shows an overall increase from 393 to 401.

For each genus, the author and date of publication are given, but it is to be regretted that the majority of these references are absent from the bibliography. Moreover, in the Rhodophyceae, certain errors in the citation of either the author, or the date of publication, have been carried forward: for instance, the date of publication of *Scinaia* Bivona is given as 1882 instead of 1822 and that of *Trailliella* Batters as 1876 instead of 1896. In treatment of species, only the authors are cited, without any references and with no organised list of synonyms. Professor Taylor states in the introduction (p. 24) that 'for the better-known species original citations seem superfluous' and recommends the use of De Toni for such information. There are, however, certain objections to this suggestion: not all phycologists have easy access to a copy of De Toni; a search through the original volumes and supplements is often laborious, and many changes have been made during the 70 years since De Toni was first published.

The descriptions of the species and genera are clear and concise and constant reference is made to the excellent illustrations at the back of the volume. The first edition included under each species a series of references to sources dealing with structure and reproduction. Such references are, however, omitted in the second edition, except where American studies are involved. Professor Taylor argues that the publications of Fritsch, Kylin and other phycologists make such anatomical information superfluous. This, however, leads to some omissions which are to be regretted.

The classification and nomenclature adopted in the second edition have been brought more into line with present usage, though Professor Taylor has taken a very conservative point of view on some topics. With regard to heteromorphic life-histories, the entities which have become associated in this way are left in their original positions in the classification and the fact of their association is dismissed in a footnote. In this connection it is difficult to see why *Conchocelis* is retained in the Nemalionales, whether or not one regards it as an autonomous genus. With regard to the species concept adopted by the author, it is to be regretted that Professor Taylor, with his great knowledge of the algae of the American continent, has not been able to make more positive statements as to the status of various critical entities, or to bring up-to-date comments on the variability and form range of many species e.g. *Callithamnion byssoideum*.

Professor Taylor states (p. 23) that whilst the first edition offered descriptions of the algae of the northeastern coast of North America, together with all pertinent information on their structure and life-history, the increase in knowledge of these algae has rendered it impossible to combine the features of a taxonomic manual with those of works of a more general nature. The second edition has been produced primarily as a "district manual" rather than as a critical taxonomic monograph and, as such, the book will undoubtedly be welcomed and will prove of great value.

Peter S. Dixon.

KORSHIKOV, O.A. *Viznachnik prosnovodnikh bodorostei Ukrains' koi RSR.*
V. Pidklas Protokokovi (Protococcineae). Ukrainian Academy of Sciences,
Kiev. 1953. Price 18s 6d. pp. 436, with 431 figs. in the text.

This is a remarkable algal flora; in some respects it is one of the finest ever produced. Korshikov was an observer of great ability. Like Pascher, he had a flair for discovering new and interesting alge, and for elucidating their structure and life histories. Practically all of the four hundred and thirty one figures are original. They are clearly drawn, though not always very well reproduced. It is clear that he is describing algae which he has himself studied in detail. He adds very considerably to our knowledge of the group which has not been monographed for some forty years. Over twenty new genera and many new species are described, but it is impossible to give details of these in this short note, or of the many new facts and viewpoints. He includes all non-motile, non-filamentous green algae (desmids excluded) in the sub-class Protococcineae though he retains his order Vacuolales. This seems to me right for there is no fundamental difference between tetrasporine, palmelloid, dendroid and coccoid forms, any more than there is a clear demarcation between these and motile green algae. He also includes in it *Pleurococcus* and *Raphidonema*; the latter he shows to be oogamous.

It was not Korshikov's fault that, despite its classic nature, this book is in some ways so unsatisfactory. It is another legacy of the war. According to the preface he disappeared during the war, according to other sources he was murdered by the Germans in 1942. All phycologists owe a great debt of gratitude to Professor J.V. Roll of Kiev University and his colleagues who prepared the manuscript for the press exactly as Korshikov left it. The book was clearly finished before his death but it was not published until more than ten years afterwards, and then in Ukrainian. So far, relatively few copies seem to have reached other countries. Apart from a few at the end of the introductory chapter on the structure and reproduction of these algae, there are no references. It appears that the literature has only been consulted up to 1939 and not completely even up to that date. An exception is the section on *Scenedesmus* written by N.T. Dedusenko. A good many algae he describes as new have been published after he finished his book but before it itself was published. At lease one name has since been applied to another genus in the same group. He has also tended to separate algae generically on what may seem insufficient or unsatisfactory grounds. It is certain that Korshikov's re-arrangements are likely to be followed by further ones by other phycologists; indeed the process has already begun. Thus the taxonomy and nomenclature of the group will become even more involved. One thing, however, is certain and that is that this fine book is essential for anyone who studies these algae.

J.W.G. Lund.

REPORT: **The Freshwater Biological Association:** twenty-fifth annual report for the year ending 31st March 1957. Pp. 64. Price to non-members 3s 6d.

In the report of the director on the scientific work of the staff are to be found references to researches and publications of interest to phycologists. It is now well known that organic compounds play an important direct or indirect part in the nutrition of a wide variety of algae. Analyses of Windermere water show that the amount of organic carbon present is very similar to that in the inflowing streams. Somewhat higher values may be found in May and June and this increase may be from algae after the spring maximum. Measurements of the absorption spectra of these samples also suggests that the additional carbon is of a different nature from that normally present. The bottom deposits do not seem to yield sufficient organic matter to add appreciably to the concentraction in the water. A start has been made in estimating trace elements. Zinc varies greatly from lake to lake, ranging from 1 - 100 µg/litre; rainwater is often rich in zinc, containing about 100 µg/litre. Elementary analyses of algae have shown phorphorus contents of 0.2 to 1.0% of the dry weight and sulphur from 0.34 to 2.1%. Further analyses of rain water have been made and of the waters of lakes, meres, lochs and bog pools from a variety of places, including some Cheshire and Shropshire meres whose plankton has been studied by British phycologists in the past.

Examination of the smaller nannoplankton of the local lakes continues, and a start made in growing some of the larger colonial Chlorophyceae for experimental purposes. In a note concerning the efficacy of various inorganic phosphates for the growth of the diatom *Asterionella*, it is suggested that the addition of phosphorus as monobasic calcium phosphate may lead to greater growth than with other phosphorus salts because of the impurities derived from the parent material, rock phosphate. Continuation of the study of the attached algae of a local stream has yielded fresh evidence for the importance of grazing by the larvae of a caddis fly. A start has been made in the culture of one of the most abundant diatoms, *Achnanthes minutissima*, for experimental purposes.

Good progress is reported on the development of the late Professor Fritsch's collection of illustrations of freshwater algae (Phycological Bulletin 5, 18 - 21) and a parallel collection of figures of Chytridiaceous fungi has been begun.

Mycological investigations have been mainly on saprophytic Phycomycetes but routine observations on those parasitising algae continue.

The Pollution Unit is working in the laboratory of the Water Pollution Research Laboratory. The relationship between the available light and algal growth in sewage effluent and river water is being studied. This is closely connected with the work on the oxygen balance of rivers for which estimations of photosynthetic rates are being made. Both investigations are still in the early stages and various methods are being developed and tested.

J.W.G. Lund.

News Bulletin of the Phycological Society of America: vol. X. nos. 29 - 32. 1957.

Four numbers of the News Bulletin of the Phycological Society of America were produced during 1957. As in 1956, a good deal of attention has been paid to listing publications of phycological interest; and while Bulletin no. 29 gives a list of publications during 1954 on agricultural and industrial utilization, the major part of Bulletin no. 30 and the whole of Bulletin no. 31 are devoted to general reviews of the phycological literature for 1955.

As well as literature lists, abstracts of papers read at meetings of the Society are given: in Bulletins nos. 29 and 30, of papers read during the Symposium on the Nutrition of Algae, which was held at the Society's Meeting at the University of Connecticut in August 1956; and in Bulletin no. 32, following the Meeting of the Society at Stanford University in August 1957, reports are given of papers on subjects ranging from the uptake of ammonia and nitrate nitrogen by green algae to electron-micrographs of *Chlamydomonas*.

E. Conway.

LETTERS TO THE EDITOR

THE MARINE ALGAL FLORA OF THE CHANNEL ISLANDS

Studies of the marine algae of the Channel Islands have been made by a number of investigators (Marquand, 1901; van Heurck, 1908; Lyle, 1920. 1923, 1937; Chemin, 1934a, 1934b), so that the area is probably as well-known algologically as any part of the British Isles. Nevertheless, during two visits to the Channel Islands, made in 1955 and 1957, it was possible to add a number of new species to the flora and also to elucidate certain problems of ecology and distribution. Collections were made in Guernsey and Sark in both 1955 and 1957, whilst in 1955 a short visit was paid to Herm and in 1957 some time was spent in Alderney. Attention was directed towards the Florideae, with particular reference to those species which occur in the sub-littoral region. In 1957, many of the sub-littoral collections were made with the aid of a diving mask and breathing tube.

Pterocladia pinnata **(Huds.) Papenf.**

According to Lyle (1920) this species occurs extensively in Guernsey, but at the present time it is much more abundant between Pleinmont Point and L'Angle than at any of the localities cited. Surprisingly, the species has not been listed previously for Sark, as it was abundant in the deep pools near Venus Pool, both in 1955 and 1957.

Grateloupia filicina **(Wulf.) Ag.**

Despite widespread search, *Grateloupia filicina* could not be found in Guernsey, even in the localities given by Marquand and Lyle, but it was collected in quantity in 1957 on Sark (near Venus Pool) and Alderney (Hannaine Bay, beneath Chateau Clonque), for which it had not been reported by previous collectors.

Naccaria wiggii **(Turn.) Endl.**

Lyle (1920) only records drift specimens of this species in Guernsey, whilst it does not appear to have been collected in any of the other islands. In 1957, *Naccaria* occurred abundantly in the sub-littoral in both Guernsey and Alderney, in the former at Portelet Harbour, Lihou Island, Moulin Huet and Petit Port, in the latter at Hannaine Bay.

Asparagopsis armata **Harv.**, *Falkenbergia rufolanosa* **(Harv.) Schm.**

This 'species' would appear to have arrived in the Channel Islands well before 1934, for in that year Chemin reported the two entities as abundant in both Alderney and Guernsey. In Sark, Chemin noted the presence of *Falkenbergia* and a single large tuft of *Asparagopsis* near Grotto Gioliot, whilst three years later Lyle (1937) found *Asparagopsis* in some quantity, although she was unable to confirm the occurence of *Falkenbergia*. The two entities are now well-established throughout the islands, forming dense masses in the lower mid-littoral and sub-littoral regions, extending to a depth of about ten metres below low-water of spring tides.

Bonnemaisonia asparagoides **(Woodw.) Ag.**

Information on the occurence of this species in the Channel Islands is very scanty. Lyle (1920) reports small specimens washed ashore at several localities in Guernsey, Chemin (1934b), a single specimen in the drift near Clonque (Alderney), whilst Marquand (1901) records the species from Sark without giving the locality or the condition in which it was found. In 1957, the species was abundant in the sub-littoral region between Portelet Harbour and Lihou Island (Guernsey), in Grande Greve (Sark) and in Hannaine Bay beneath Chateau Clonque (Alderney).

Bonnemaisonia clavata **(Schousb.) Hamel.**

Not previously recorded for the area, a single specimen was collected from the sub-littoral region outside Portelet Harbour, Guernsey, in 1955; whilst in 1957, several collections were made from the same locality.

Bonnemaisonia hamifera **Hariot,** *Trailliella intricata* **Batt.**

Not previously recorded for the area, two specimens of *B. hamifera* were collected in 1957 from the sub-littoral region outside Portelet Harbour, Guernsey, and a further small specimen was found at Chateau Clonque, Alderney entangled in a sub-littoral clump of *Cystoseira* sp.. *Trailliella intricata* has been recorded for Alderney (van Heurck, 1908) and Sark (Lyle, 1937). Unsuccessful attempts to collect *Trailliella* were made in both 1955 and 1957, but the species could not be detected amongst the mass of *Falkenbergia* present. The rarity of *B. hamifera* and *T. intricata* is most surprising in view of the frequency with which they occur on the coasts of Brittany and the Cherbourg peninsula.

Antithamnion sarniense **(Lyle) G. Feldm.**

This species was described originally by Lyle from material collected in intertidal pools in Guernsey in 1921. The general impression appears to have been that whilst the species was spreading throughout southwest England, it has been disappearing gradually from the Channel Islands since its original discovery (Lyle, 1937). *A. sarniense* was of frequent occurrence in Guernsey both in 1955 and 1957, occurring in the sub-littoral region as an epiphyte on other algae or on *Zostera*. A few plants were collected in Sark (Grande Greve) in 1955 as epiphytes on *Zostera*, and at Alderney (Hannaine Bay) in 1957, as epiphytes on *Cystoseira* sp.. The apparent 'disappearance' of the species may have been caused by its change of habitat from the mid-littoral to the sub-littoral region.

Ceramium codii **(Richards) Mazoyer.**

Not previously recorded for the area, a small quantity of the species was detected in a collection of *Ceramium ciliatum* made below low-water of spring tides at Portelet Harbour, Guernsey, in 1955. Despite a widespread search of the Harbour and adjacent areas in 1957, no further specimens were collected.

Crouania attenuata **(Ag.) J. Ag.**

This rather rare but characteristic species is of frequent occurrence in Guernsey, but rather surprisingly it has not been reported previously for Sark and the only records for Alderney (Fort Houmet, Longy) are those of Marquand (1901). A number of specimens were collected in shallow crevices in the rock near low-water of spring tides at Venus Pool, Sark, both in 1955 and 1957, whilst in Alderney, in 1957, the species occurred abundantly on a rough boulder just below low-water of spring tides, at Chateau Colonque.

Laminaria ochroleuca **La Pylaie.**

First reported in all four major islands of the group by Chemin (1934a, 1934b) this species is now widespread and very abundant, particularly in Alderney and Guernsey. Lyle (1937) was unable to confirm the presence of *L. ochroleuca* in Sark, but this was probably due to the comparative rarity of the species in this island caused by the lack of suitable habitats. The cliffs fall sheer into the sea and depths of up to 50 metres occur within a short distance of the shore. The sub-littoral vegetation is not particularly extensive except in one or two bays and investigation is made difficult by the high swell which occurs even on the calmest days. In 1957, it was possible to confirm the presence of *L. ochroleuca* in some quantity on the north side of Grande Greve and also to locate a few plants off Little Sark, near venus Pool.

References:

CHEMIN, E., 1934a. Une excursion algologique aux iles angle-normandes. *Bull. Lab. Mus. Hist. nat. St-Servan,* 12, 1 - 22.

CHEMIN, E., 1934b. La flore algologique de l'ile Aurigny dans ses rapports avec celle du Cotentin. *Bull. Lab. Mus. Hist. nat. St-Servan,* 13, 6 - 21.

HEURCK, H. van, 1908. *Prodrome de la flore des algues marines des iles anglo-normandes et des cotes nord-ouest de la France,* St-Helier.

LYLE, L., 1920. The marine algae of Guernsey. *J. Bot., Lond.,* 58, 1 - 53.

LYLE, L., 1923. Additions to the marine flora of the Channel Islands. *J. Bot., Lond.,* 61, 197 - 200.

LYLE, L., 1937. Additions to the marine flora of Sark. *J. Bot., Lond.,* 75, 12 - 22.

MARQUAND, E.D., 1901. *Flora of Guernsey and the lesser Channel Islands; namely Alderney, Sark, Herm, Jethou and the adjacent islets,* London.

P.S. Dixon.

THE OCCURRENCE OF GELIDIUM SESQUIPEDALE (CLEM.) THUR. IN THE BRITISH ISLES

Gelidium sesquipedale (Clem.) Thur. is probably the most characteristic and the most easily identified of all the european species of *Gelidium.* It is therefore surprising that the northern limits of its distribution have not been known with any degree of accuracy. The contradictory statements in the literature on the distribution of this species result from two principal causes:-

1). The species occurs in the sub-littoral region, in very exposed situations, so that most collections have been made of drift specimens, which may occur at considerable distances from their place of origin. In this connection, it should be noted that specimens of *Gelidium cartilagineum,* for which the northern limit is in the Canary Islands, have drifted to Norway, Heligoland, Schleswig-Holstein and the Shetlands.

2). Despite the very characteristic appearance of *G. sesquipedale,* misidentifications have occurred frequently; of the nine specimens so named in the Herbarium of the British Museum (Natural History), only one is genuine, the remainder are in fact of the entity previously described as *G. attenuatum.*

Three genuine specimens of *Gelidium sesquipedale,* collected in the British Isles, have been located in herbaria:-

a). 'Torquay, leg. Wyatt comm. Traill' : Herbarium of the British Museum (Natural History).

b). 'Sidmouth, 1832' : Herbarium, Trinity College, Dublin.

c). 'Penzance, 26.3.65, J. Bectier' : Herbarium, Manchester Museum.

From their colour and appearance it is clear that these are drift specimens. The records for Sidmouth and Torquay, given by Batters (1902) would appear to be based on the first two specimens cited above. Despite a widespread search along the southern coasts of England and Ireland, undertaken for a number of years by Dr M. de Valéra and myself, no further evidence for the occurence of *G. sesquipedale* could be obtained. According to Feldmann and Hamel (1936), most of the specimens collected on the Atlantic coasts of France came from the drift; these authors suggested that Argenton (Finisterre) possibly represented the most northerly location for the species growing *in situ* and that it was absent from the French Channel coast. From the evidence then available, I concluded that *G. sesquipedale* could not be regarded as an indigenous British species (Dixon, 1952).

This conclusion has now been shown to be completely wrong. Dr M. Naylor and a group of students collected a large quantity of an unknown species of *Gelidium* growing *in situ* at Church Reef, Wembury, S. Devon, during an exceptionally low spring tide on September 26th 1957. A number of specimens submitted to me for identification were of *G. sesquipedale*, well-developed and two to three years old.

The occurence of *G. sesquipedale* on the coasts of England is now proved, and it is of interest that Feldmann (1954) has recently reported the species growing *in situ* at Roscoff, on the French side of the English Channel. Further information is required to give a true picture of the distribution of *G. sesquipedale* and I would be grateful if any phycologists working on the south coasts of England and Ireland would forward to me any collections which they think might belong to this species.

Note:-

The species *Gelidium sesquipedale* is based upon *Fucus corneus* var. *sesquipedalis* for which the first valid description was published by Clemente (1807) in an appendix to an obscure work dealing with the cultivation of the vine. Turner (1819, p. 146) cited Clemente as the original authority for the epithet, but most subsequent authors have attributed it in error to Turner.

References:

BATTERS, E.A.L., 1902. A catalogue of the British marine algae. *J. Bot., Lond.*, **40**, (Suppl. 2), 1 - 107.

CLEMENTE y RUBIO, S. de R., 1807. *Ensayo sobre las variedades de la Vid común que vegetan en Andalucía, con un índice etimológico y tres listas de plantas en que se caracterizan varias especias nuevas*, Madrid.

DIXON, P.S., 1952. *Studies in the Gelidiaceae*, Ph.D. Thesis, University of Manchester.

FELDMANN, J., 1954. Inventaire de la flore marine de Roscoff. *Trav. Sta. biol. Roscoff*, **6**, (Suppl.), 1 - 152.

FELDMANN, J., & HAMEL, G., 1936. Floridées de France. VII. Gelidiales. *Rev. algol.*, **9**, 209 - 64.

TURNER, D., 1819. *Fuci, sive Plantarum Fucorum generi a botanicis ascriptarum, icones, descriptiones et historia*, London.

Dept. of Botany,
University of Liverpool.

P.S. Dixon.

BALBIANIA, A RED ALGAL EPIPHYTE OF BATRACHOSPERMUM

Balbiania investiens (Lenormand) Sirodot (*Audouinella investiens* (Lenorm.) Kylin) is a monotypic member of the Nemalionales allied to *Rhodochorton* and *Acrochaetium* and occurs only as an epiphyte on *Batrachospermum.*

This was found in July 1957 in Blake Beck, near Ambleside, Westmorland. (National Grid Reference NY 355033). It was growing abundantly on a species of *Batrachospermum* belonging to the Moniliformia section, probably *B. pyramidale* Sirodot.

Records of *Balbiania* have so far been restricted to France and England (Skuja, 1938). The only British record seems to be a specimen collected by Ralfs near Penzance in 1839. This is mentioned by Hassall (1845) under the name of *Batrachospermum rubrum* Hassall, for he regarded host and epiphyte as one organism.

An accurate description was given by Sirodot (1876), who created the genus *Balbiania.*

The Ambleside material, which was bright red in colour, showed numerous monosporangia, carpogonia and antheridia, though no post-fertilisation stages were seen. The sexual organs, monosporangia and young plants arising from germinated monospores all agreed closely with Sirodot's figures.

I wish to thank Dr J.W.G. Lund, who confirmed the identification.

References:

HASSAL, A.H., 1845. *A History of the British Freshwater Algae.* London. **I**, 113.

KYLIN, H., 1954. *Die Gattungen der Rhodophyceen.* C.W.K. Gleerups, Lund.

SIRODOT, M.S., 1876. Le *Balbiania investiens. Ann. Sci. Nat. Bot.* **6**, 146 - 174.

SKUJA, H., 1938. Comments on Freshwater Rhodophyceae. *Bot. Rev.* **4**, 665 - 678.

Sir John Cass College,
London.

Erica M.F. Swale

REQUESTS FOR RESEARCH MATERIAL

1) **Dr Maud Godward** (Dept. of Botany, Queen Mary College, University of London, London, E.1.) will be grateful to receive material of *Spirogyra crassa* from any source.

2) **Miss Erica Swale** (Sir John Cass College, Jewry St. Aldgate, London, E.C.3.) will be grateful to receive material of *Batrachospermum* and *Thorea* and of any other multiaxial member of the Nemalionales. Collectors are asked to fix material in formalin acetic alcohol and to state the locality from which any specimen is gathered.

3) **Dr T. Christensen** (Universitetets Botaniske Laboratorium, Gothersgade 140, Kobenhavn, K.) who has agreed to be responsible for the genus *Vaucheria* for the new Flora of British Marine Algae, will be grateful to receive preserved collections of fruiting material from any part of the British Isles.

4) **Dr Erica Post** (Worthstrasse, 15, 24 (b) Kiel, Germany) will be grateful to receive records of the occurrence of male, female and tetrasporic plants of *Bostrychia scorpioides* in the British Isles.

ALGAL RECORD CARDS

Members of the society are reminded that printed cards are available at a cost of 3/- per 100 for recording data concerning the distribution of marine algae. These may be obtained from the Secretary of the Sub-Committee for Marine Algal Check-list and Flora, Dr E.M. Burrows (Hartley Botanical Laboratories, The University, Liverpool, 3). Completed cards should be sent to Mrs Dorothy Hepper, Fisheries Experiment Station, Castle Bank, Conway, who will replace the cards used FREE OF CHARGE.

The Society urges the use of these cards for all algal species, however common or rare, whenever members visit any shores in the British Isles, especially those for which few records are available, e.g. Lincolnshire, Yorkshire, Durham, Kirkcudbright, Dumfries, S. Wales and the east coast of Ireland. Such records are urgently required by those responsible for the parts of the new Marine Flora in order to complete distribution maps for all British species.

BRITISH PHYCOLOGICAL SOCIETY
LIST OF MEMBERS (at 1st APRIL 1958).

(Corrections, additions, and notices of temporary or permanent changes of address should be sent to the Hon. Secretary).

Mr A. D. Cotton, Dr E. M. Delf and Dr M. Knight are **Honorary Members** of the Society.

ALLEN, Miss M. Ann, A.B., Department of Botany, Indiana University, Bloomington, Indiana, U.S.A.
AUSTIN, A.P., B.Sc., Marine Biology Station, Menai Bridge, Anglesey, North Wales.
BELCHER, J.H., Ph.D., Department of Botany, University College of London, Gower Street, London W.C.1.
BEXON, Miss D., M.Sc., F.L.S., Department of Botany, The University, University Park, Nottingham.
BLACKLER, Miss Helen, Ph.D., F.L.S., The Gatty Marine Laboratory, The University, St Andrews, Fife.
BOALCH, G.T., B.Sc., Department of Botany, University College of London, Gower Street, London W.C.1.
BONEY, A.D., 24 Ford Park Road, Mutley, Plymouth, Devon.
BROOK, A.J., Ph.D., Freshwater Fisheries Laboratory, Faskally, Pitlochry, Perthshire.
BURKILL, H.M., M.A., F.L.S., Assistant Director, Botanic Gardens, Singapore 10, Malaya.
BURNETT, Professor J.H., M.A., D.Phil., Department of Botany, The University, St Andrews, Fife.
BURROWS, Mrs E.M., Ph.D., The Hartley Botanical Laboratories, University of Liverpool, Liverpool 3.
BUTCHER, R.W., Ph.D., F.L.S., Fisheries Laboratory, Burnham-on-Crough, Essex.
CAMPION, Miss Mary, M.Sc., Ph.D., Department of Biology, University College of North Staffordshire, Keele, Staffs.
CARTER, Miss N., D.Sc., 80 The Mount, Guildford, Surrey. (At: Guildford Technical College).
CARTER, P.W., M.Sc., Department of Botany, University College of Wales, Aberystwyth, Cardiganshire.
CHALKLIN, Miss K.M., M.Sc., Department of Botany, University Science Laboratories, South Road, Durham.
CHAMBERLAIN, Miss Yvonne M., B.Sc., Department of Botany, British Museum (Nat. Hist.), Cromwell Road, London S.W.7.
CHIU, Miss B.T., B.Sc., Department of Botany, The University, Hong Kong, East Asia. (At: University Hall, Bangor, Caernarvonshire, North Wales, until October 1958).
CHRISTENSEN, T., Universitetets Botaniske Laboratorium, Gothersgade 140, København K, Denmark.
CHRISTIANSON, Mrs Iona G. (née MACLENNAN), M.Sc., C/o Department of Botany, University of Melbourne, Carlton, Victoria, Australia.
CLAY, Miss E., M.Sc., Green Hollow, Gattery Lane, Higher Brixham, Brixham, South Devon. (At: I.C.I. Marine Laboratory, Brixham).
CONWAY, Mrs E., Ph.D., Department of Botany, The University, Glasgow W.2.
COTTON, A.D., F.L.S., Honey Cottage, Farnham Common, Bucks.
CRIBB, A.B., M.Sc., Department of Botany, University of Queensland, Brisbane, Queensland, Australia.
DAVENPORT, Miss E., B.S., 3 Sheldon Avenue, Vicars Cross, Chester.
DAVEY, Miss A.J., 20 Deiniol Road, Bangor, Caernarvonshire, North Wales.
DELF, Dr E. Marion, 243 Haverstock Hill, London N.W.3.
DICKINSON, Miss C.I., M.A., The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey.
DIXON, P.S., M.Sc., Ph.D., The Hartley Botanical Laboratories, University of Liverpool, Liverpool 3.
DOUGLAS, Miss Barbara, B.Sc., The Ferry House, Far Sawrey, Ambleside, Westmorland.
DROOP, M.R., Ph.D., Marine Station, Millport, Isle of Cumbrae, Scotland.
ETHERINGTON, Mrs Joy (née KERSLAKE), B.Sc., 1 St John's Gardens, London W.11.
EVANS, J.H., Ph.D., 2 Dorset Road, Harrow, Middlesex. (At: Biology Section, Department of Anatomy, Royal Veterinary College, Royal College Street, London N.W.1).
FELDMANN, Professor J., Faculté des Sciences, Institut Océanographique, 195 rue Saint Jacques, Paris 5e, France.
FOGG, G.E., Ph.D., Department of Botany, University College of London, Gower Street, London W.C.1.
FRIEDMANN, I., D.Phil., Department of Botany, The Hebrew University, Jerusalem, Israel. (At: Department of Botany, University of Manchester, Manchester 13).
GEORGE, E.A., M.A., The Culture Collection of Algae & Protozoa, The Botany School, Downing Street, Cambridge.
GODWARD, Miss Maud B.E., Ph.D., Department of Botany, Queen Mary College, Mile End Road, London E.1.
GREIG-SMITH, Mrs E., Gwyndy, Menai Bridge, Anglesey, North Wales.
HARE, Miss M.P., B.Sc., Crooklands, Badminton Road, Old Sodbury, Nr. Bristol. (At: The University, Reading).
HARRIS, Mrs K., B.Sc., 47 Elm Road, Earley, Reading, Berkshire.
HARTSHORNE, J.N., B.Sc., Department of Botany, University of Manchester, Manchester 13.
HENDEY, N.I., F.L.S., Admiralty Materials Laboratory, Holton Heath, Dorset.

HEPPER, Mrs Dorothy (née BALLANTINE), B.Sc., C/o Fisheries Experiment Station, Castle Bank, Conway, Caernarvonshire, North Wales.
HOEK, C. van den Rijksherbarium, Nonnensteeg 1, Leiden, Netherlands.
HOFFMANN, Professor Dr C., Institut für Meereskunde der Universität Kiel, Botanische Abteilung, Hohenbergstr 2, Kiel, Germany.
HUNTER, Miss E.I., M.Sc., 57 Val Plaisant, St Helier, Jersey, Channel Islands.
IRVINE, D.E.G., Ph.D., 4 Cranmer Road, Cambridge.
IRVINE, Mrs Linda M. (née NEWTON), B.Sc., 4 Cranmer Road, Cambridge.
ISAAC, Professor W.E., Department of Botany, University of Cape Town, Cape Town, South Africa.
JONES, R.F., Ph.D., Sandilands, Seascale, Cumberland. (At: Atomic Energy Authority U.K. (I.G.) Biol. Group, Research & Development Branch, Windscale Works, Sellafield, Cumberland).
JONES, W.E., Ph.D., Marine Biology Station, Menai Bridge, Anglesey, North Wales.
KAIN, Miss J.M., B.Sc., Marine Biological Station, Port Erin, Isle of Man.
KNIGHT, Miss Margery, D.Sc., F.L.S., Shee Dy Vea, Darragh, Port Erin, Isle of Man.
KORNMANN, Professor Dr P., Biologische Anstalt Helgoland, List/Sylt, North Frisian Islands, Germany.
KOSTER, Dr Joséphine Th., Rijksherbarium, Nonnensteeg 1, Leiden, Netherlands.
KRISHNAMURTHY, V., Ph.D., Department of Botany, Presidency College, Madras, India.
KYLIN, Mrs Elsa, Stora Sodergatan 4, Lund, Sweden.
LACEY, A.J., Ph.D., Eckington Grammar School, Halfway, Sheffield, Yorks.
LAWSON, G.W., Ph.D., Department of Botany, University College of Ghana, Achimota, Ghana, West Africa.
LEEDALE, G.F., Ph.D., Department of Botany, University Science Laboratories, South Road, Durham.
LEVRING, Dr T., Marinbotaniska Institutionen, Botaniska Trädgarden, Göteborg, Sweden.
LEWIS, J.R., Ph.D., Department of Zoology, The University, Leeds 2, Yorks.
LIND, Miss E.M., Ph.D., Makerere College, P.O. Box 262, Kampala, Uganda, Africa.
LUND, J.W.G., Ph.D., D.Sc., The Ferry House, Far Sawrey, Ambleside, Westmorland.
LUND, Mrs Hilda M. (née CANTER), Ph.D., D.Sc., Ellerbeck, Ellerigg Road, Ambleside, Westmorland.
MACFARLANE, Miss Constance, M.Sc., Nova Scotia Research Foundation, Box 1027, Halifax, Nova Scotia, Canada.
MADGE, Miss M.A.P., Ph.D., Department of Botany, Royal Hollway College, Englefield Green, Surrey.
MARTIN, Miss M.T., Ph.D., F.L.S., University Hall, Bangor, Caernarvonshire, North Wales.
MILLER, J.D.A., Ph.D., 21 Hillfield Park, London N.10. (At: Department of Botany, University College of London, Gower Street, London W.C.1).
MOSS, Miss Betty, M.Sc., Ph.D., F.L.S., Department of Botany, King's College, Newcastle-upon-Tyne 1.
NAYLOR, Miss Margaret, Ph.D., Department of Botany, University of Hull, Hull, Yorks.
NELSON, Mrs Sheila M. (née LODGE), Ph.D., 18 Willowbank Road, New Ferry, Wirral, Cheshire.
NEUSHUL Jr., M., B.A., Division of Marine Botany, Scripps Institution of Oceanography, La Jolla, California, U.S.A.
NEWTON, Professor Lily, Ph.D., D.Sc., F.L.S., Department of Botany, University College of Wales, Aberystwyth, Cardiganshire.
NICOLAI, Dr M.F. Emilie, Director of Hydrobiological Institute, Burggraven laan 245, Leiden, Netherlands.
NIELSEN, Mrs O.S. (née FOX), B.Sc., C/o U.M.S. Nigeria Bookshops, Oxford House, P.O.B. 33, Ibadan, Nigeria, West Africa.
NIZAM, J., B.Sc., At: Department of Botany, Queen Mary College, Mile End Road, London E.1.
PARKE, Miss Mary W., Ph.D., D.Sc., F.L.S., The Laboratory, Citadel Hill, Plymouth, Devon.
PARKES, Miss Hilda M., M.Sc., 52 Leeson Park Dublin, Ireland. (At: Trinity College, Dublin).
POWELL, H.T., B.Sc., Marine Station, Millport, Isle of Cumbrae, Scotland.
POWELL, Mrs H. Grace, (née KERR), B.Sc., Freeland, Marine Parade, Millport, Isle of Cumbrae, Scotland.
PRASAD, B.N., M.Sc., Department of Botany, Lucknow University, Lucknow, India. (At: Department of Botany, Queen Mary College, Mile End Road, London E.1).
PROWSE, G.A., Ph.D., C/o Department of Botany, University of Malaya, Singapore, Malaya.
RAO, C.S.P., M.Sc., Department of Botany, Banaras Hindu University, Varanasi, 5, United Provinces, India.
ROSS, R., M.A., Department of Botany, British Museum (Nat. Hist.), Cromwell Road, London S.W.7.
ROUND, F.E., Ph.D., Department of Botany, University of Bristol, Bristol 8.
SARMA, Y.S.R.K., M.Sc., Ph.D., Department of Botany, Banaras Hindu University, Varanasi 5, United Provinces, India.
SAYI, E.R.S.T., M.Sc., Department of Botany, Banaras Hindu University, Varanasi 5, United Provinces, India. (At: Department of Botany, University College of London, Gower Street, London W.C.1).
SELBY, C.H., Ph.D., 115 Grove Hill, South Woodford, London E.18.
SIMONS, R.S., M.Sc., Department of Botany, University of Cape Town, Cape Town, South Africa.
SINCLAIR, J., B.Sc., Curator of Herbarium, Botanic Gardens, Singapore 10, Malaya.
SINHA, J.P., M.Sc., Ph.D., Department of Botany, Science College, Patna, India..
SMITH, G.G., M.Sc., Department of Botany, University of Western Australia, Nedlands, Western Australia.
SPEARING, J.K., Ph.D., Lindeth, 59A Hitchen Hatch Lane, Sevenoaks, Kent. (At: Sir John Cass College, Jewry Street, Aldgate, London E.C.3).
SREERAMULU, T., M.Sc., Ph.D., Department of Botany, Andhra University, Waltair, India.

STANBURY, Miss F.A., M.Sc., F.L.S., Slieve Bloom, Willoway Park, Yelverton, South Devon. (At: Plymouth & Devonport Technical College, Tavistock Road, Plymouth, Devon).
SWALE, Miss Erica M.F., B.Sc., Sir John Cass College, Jewry Street, Aldgate, London E.C.3.
TALLING, J.F., Ph.D., The Ferry House, Far Sawrey, Ambleside, Westmorland.
TAYLOR, Professor W.R., M.S., Ph.D., Department of Botany, University of Michigan, Ann Arbor, Michigan, U.S.A.
THOMAS, Miss E. Mary, B.Sc., Hillside, Eden Avenue, Swansea, Glamorgan. (At: Cheltenham Ladies' College).
TULEY, P., B.Sc., C/o Department of Agriculture, Eastern Province, Nigeria, West Africa.
TURNBULL, L.P., M.Sc., Department of Botany, Bedford College, Regent's Park, London N.W.1.
TWEED, R.D., Shermoor, St George's Drive, Deganwy, Caernarvonshire, North Wales. (At: University College of North Wales, Bangor).
de VALÉRA, Miss M., M.Sc., Ph.D., Department of Botany, University College, Galway, Co. Galway, Ireland.
WAERN, Dr M., Växtbiologiska Institutionen, Uppsala Universitet, Uppsala 8, Sweden.
WALKER, F.T., B.Sc., F.L.S., Department of Agriculture for Scotland, St Andrew's House, Edinburgh 1.
WILLIAMS, Professor W.T., A.R.C.S., Ph.D., D.I.C., F.L.S., Department of Botany, University College, Southampton.
WILSON, Mrs M.A., M.Sc., Ph.D., 49 Torland Road, Hartley, Plymouth, Devon.
WOODHEAD, N., M.Sc., F.L.S., 22 Deiniol Road, Bangor, North Wales.

H.T. Powell, Hon. Secretary.